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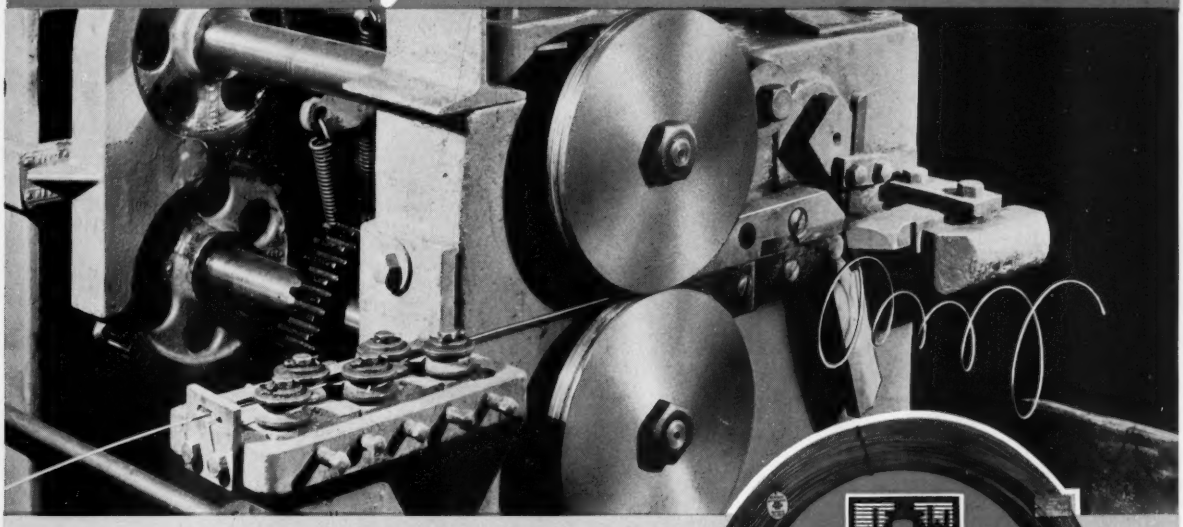

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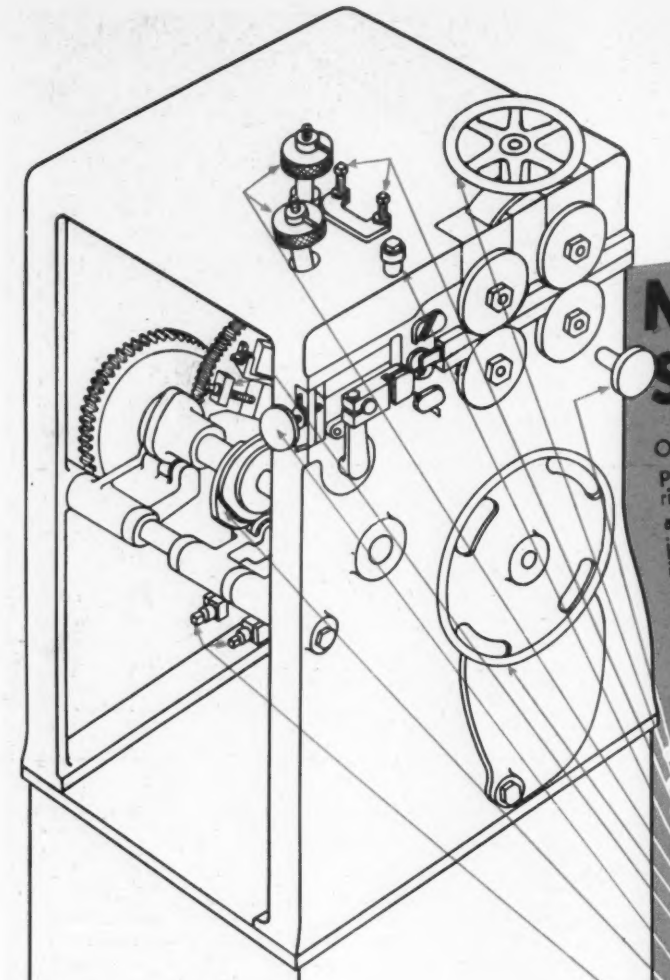

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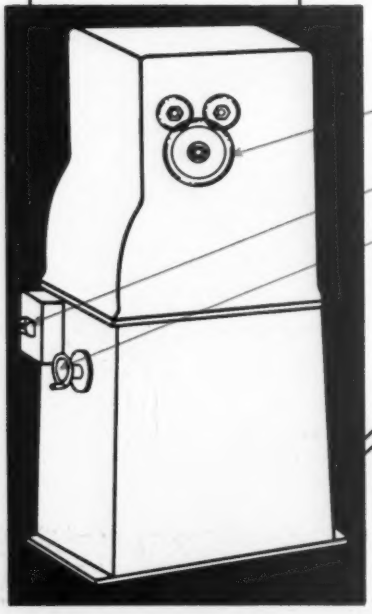

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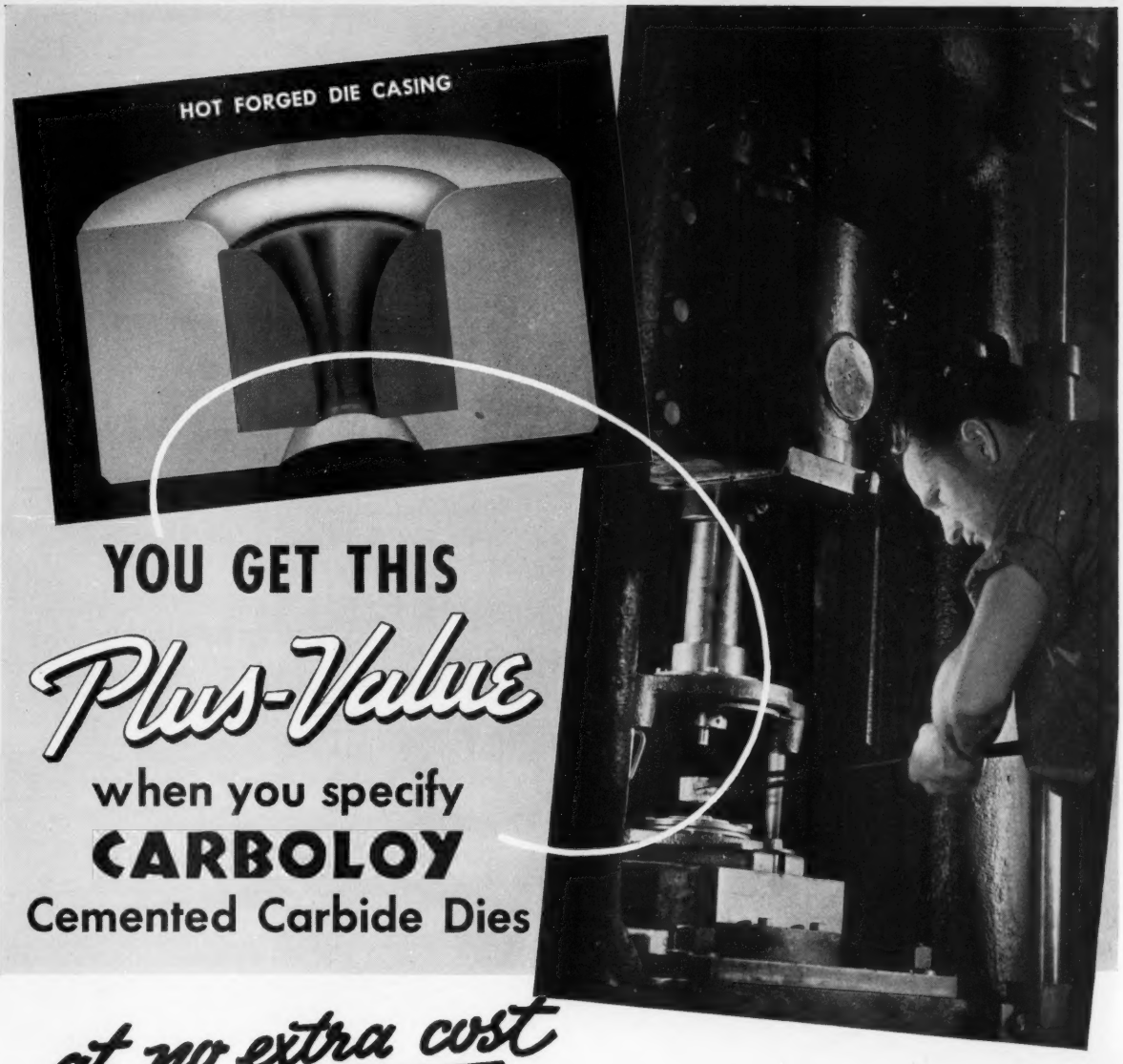

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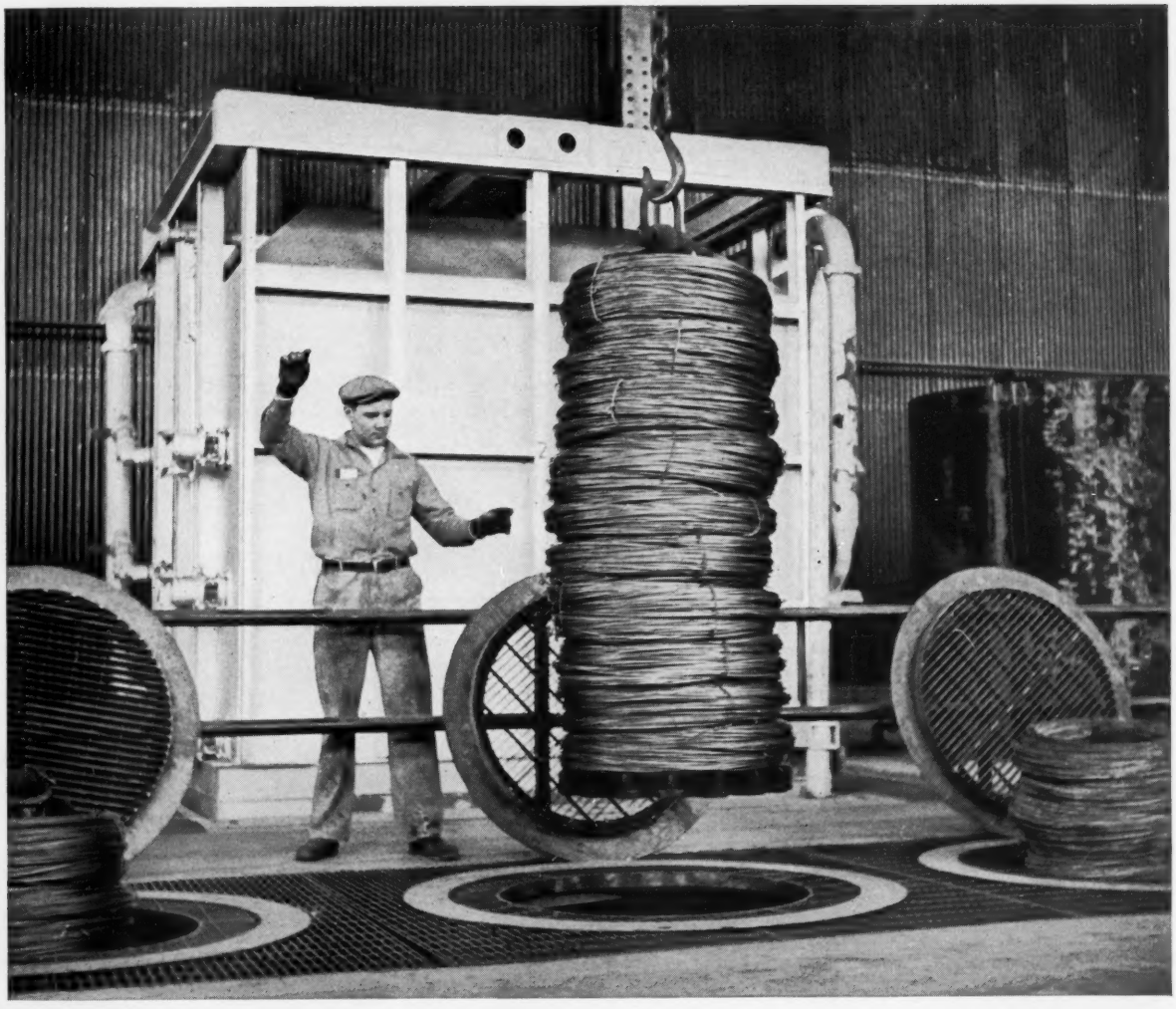

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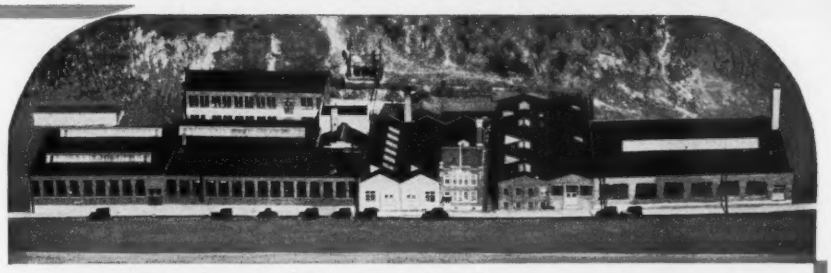

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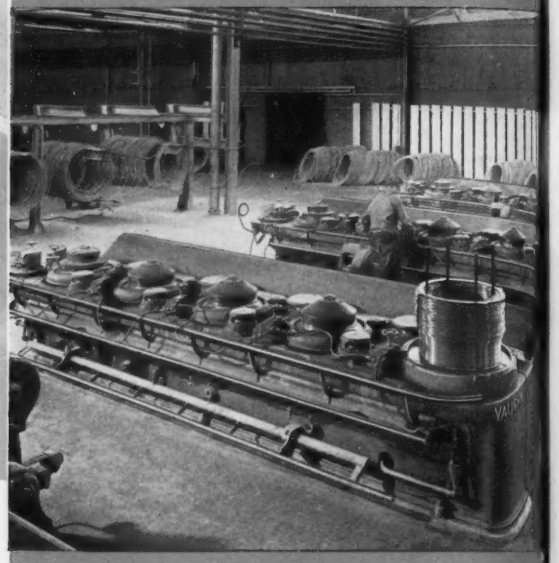

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WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable

DRAWING—ROLLING—EXTRUDING—FORMING—FABRICATING

Vol. 14 AUGUST, 1939 No. 8

Designated as

Official Publication By The Wire Association

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DRAWING --- ROLLING --- EXTRUDING --- FORMING --- FABRICATING

Vol. 14 AUGUST, 1939 No. 8

Automatic Strand Dipping For Wire Rope Manufacture

By F. J. Mahr,
Engineer, Pacific Gas & Electric Company

A method of applying tar lubricant to wire rope in a smooth, continuous operation by the use of electric heat, as developed by the Edwards Wire Rope Co. of San Francisco, Cal. ✦ ✦

TAR is not generally thought of as a lubricant. Yet, as such, in the wire rope industry it is one of the most important materials.

✦ ✦ ✦

STEEL wire ropes are composed of strands of wire, which are built up of many individual wires. When such a cable is put in service, each wire is forced against its neighbors, particularly if the cable is subjected to continual bending over sheaves. Provision must be made for lubrication in order that its wearing qualities may be improved.

✦ ✦ ✦

FULLY as important is the function that tar performs in protecting against corrosion, dirt, water and the elements. Wire ropes used in the mining, dredging and oil industries must be treated with tar, otherwise they will rust from within because of moisture finding its way between the strands. Some wire ropes are made with a Manila rope core, and these also must be treated with a lubricant not only to protect and preserve them but also to lessen the wear on them during the fabrication process.

✦ ✦ ✦

THE tar used in the wire rope industry is a compound with a petroleum base material. It is a by-product of oil refineries and is supplied in a semi-solid state in 50 gallon drums. It is stickier and considerably softer than roofing tar. It is compounded especially for the wire rope trade and varies slightly in composition and consistency, depending on the formula or specification of the rope manufacturer.

✦ ✦ ✦

THE selection of efficient and economical equipment to heat the compound is a vital factor in its successful application.

THE problem was solved by an industrial sales engineer of the **Pacific Gas and Electric Company**, who had previously worked out several other installations involving heating processes in other departments of the wire rope company.

✦ ✦ ✦

INVESTIGATION of the tar compound problem revealed that the wire rope company was experiencing difficulty in supplying to the stranding machines a sufficient quantity of the material in a properly molten state. The old process was found to consist merely of heating the compound to a molten state without regard to precise temperature, although it was vaguely known that a temperature of 270 degrees Fahrenheit was somewhere near right. Under such conditions, it was difficult to regulate the heating equipment and obtain maximum results from its use.

✦ ✦ ✦

A FURTHER check indicated that an insufficient amount of

Designated as Official Publication by the Wire Association

compound was only a part of the difficulty. As is often the case in operations in which heat in any form is used, other unseen and sometimes irksome mechanical or human deficiencies were discovered.

✦ ✦ ✦

WITH some employees it was a case of "just another barrel of tar"—an unavoidable nuisance, the handling of which was an unskilled task requiring little science or attention. How else could one deal with such a prosaic substance? Consequently the old method of heating the compound in small round pots, with open flames underneath, seemed logical because it had always been done that way. The finished strands as they came together from the stranding machine, were simply passed under a spout through which the compound flowed from the pot. An attempt to control its flow by means of a small valve was entirely impractical. It came either too fast or too slow or the spout was in the wrong position, with the result that much was wasted by falling on the floor.

✦ ✦ ✦

BY observation it was discerned that the following factors prevented smooth and continuous operation:

1) **When too much heat was applied to the pot, not enough compound adhered to the strands because it became too thin and flowed too fast.**

2) **When not enough heat was applied, the compound thickened and too much adhered to the strands. The wind up reel then also became excessively laden with surplus compound.**

3) **Proper penetration of the compound between the wires of the strand was assured only when by chance the correct temperature was reached.**

4) **Excessive temperature caused the compound to vaporize, or smoke, resulting not only in loss of material but rendering the air noticeably unpleasant and unhealthful.**

5) **The workman in endeavoring to operate the machines at highest possible speeds would occasionally apply more heat than was consistent with safety.**

6) **Fire hazard was always present, especially when production was speeded up. The presence of open flames in the heating of an inflammable commodity is at best a dangerous practice. Surplus or spilled compound overflowing the pot could easily ignite. It also could easily cause accidents and in other ways be an annoyance to the workmen.**

7) **The necessity of watching the compound pots diverted the attention of the operators from the essential concentration required in manipulating the stranding machines themselves.**

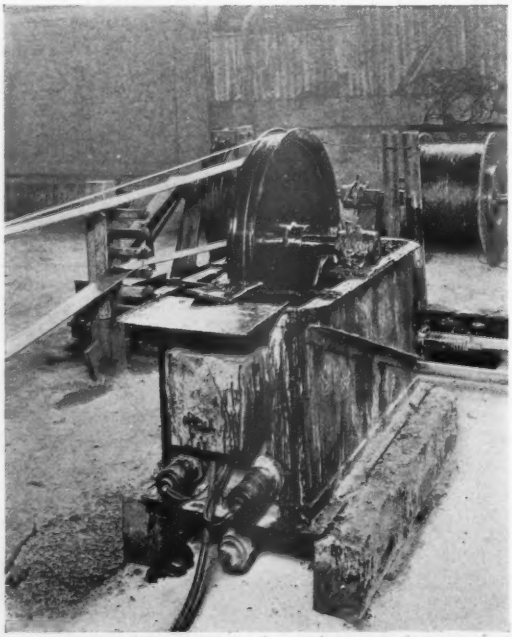
✦ ✦ ✦

WITH the problem thus analyzed, it became apparent that something more than just heat was required. In order to obtain uniform penetration and adherence of the compound, controlled heat was needed. And to eliminate hazards of fire and accidents, the heat must be automatically controlled, safe and foolproof.

✦ ✦ ✦

IT quickly became apparent that only electric heat could fill all these requirements. It was apparent, too, that with electrical heating units available in many shapes and capacities, wide latitude was permitted in designing new equipment for heating the compound and dipping the strands.

✦ ✦ ✦



Automatic Strand Dipping Tank, Edwards Wire Rope Co., San Francisco, Calif.

✦ ✦ ✦ ✦

AS a step toward the adoption of electric heat, the wire rope company constructed a large new welded tank, rectangular in shape and of such capacity that one filling per day was ample. Mounted on the top, by means of bearings on each side, is a dipping sheave. This consists of a grooved wheel that revolves within the tank, and the strand, passing around it, is immersed in the compound. This method of handling the strands proved far superior to the old and needs only the correct application of heat to make it highly efficient, safe, automatic and economical.

✦ ✦ ✦

IN estimating the heat requirements it was necessary to take into consideration the fact that the compound is difficult to handle when cold and in a semi-solid state and is heated to a temperature of 150 degrees Fahrenheit before being put into the tank. In the tank its temperature is raised to 270 degrees Fahrenheit for the strand-immersion process. Therefore, the heat demands are basically threefold:

FIRST—Heat taken up by radiation.

SECOND—Heat required to raise the compound from its charging temperature to that of application.

THIRD—Heat absorbed by the strand itself.

✦ ✦ ✦

THESE were accounted for as follows:

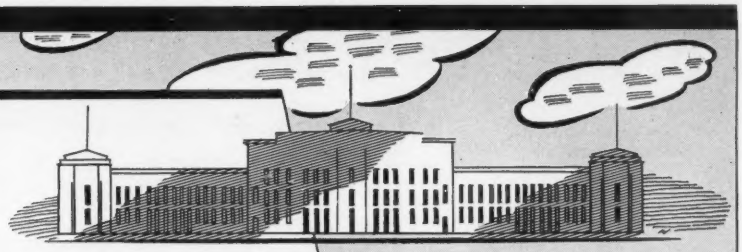
✦ ✦ ✦

Radiation from the Tank

THE four sides and top and bottom of the tank, 14″ x 18″ x 36″, have a total surface of approximately 20 sq. ft. Five sq. ft. additional were added to provide for the radiation from the 24″ diameter dipping sheave. Reference to a standard black body radiation chart, indicated radiation at 270 deg. F. amounted to 330 Btu per sq. ft.

330 Btu x 25 sq. ft. ..... 8250 Btu

(Please turn to Page 444)



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NATIONAL METAL EXPOSITION
OCTOBER 23-27
INTERNATIONAL AMPHITHEATRE—CHICAGO, ILLINOIS

Continuous Lead Extrusion Equipment

By James Day,
Wire Engineer,
London, England

A description of the continuous lead extrusion equipment developed by the two leading British equipment manufacturers. The data was supplied by Pirelli-General Equipment, Ltd., of Southampton, and Henley Extrusion Machine Company of Slough, England. ✦ ✦ ✦

IT is probably correct to say that in England the development of Continuous Lead Extrusion Equipment is further advanced than in any other country in the World. Two of our leading Cable Manufacturers have been responsible for this development and each has put in a lot of research work quite independently of the other, and both have now developed equipment which is operating successfully.

✦ ✦ ✦

THE early types of Lead Presses are, no doubt, familiar to most readers, these being the type either vertical or horizontal in which the container is first filled with molten lead, such container being fitted over a Dieblock which is so arranged that the cable can be passed through a die in this block and a hydraulically operated ram is forced into the container which is maintained at a certain definite temperature and the lead is forced through the Dieblock, over the cable, forcing the cable out with the lead covering, the outside diameter of such lead covering being determined by means of the die. Lead piping is, of course, similarly extruded.

✦ ✦ ✦

JAMES DAY

After spending some time as Engineer in the Cable Works of Messrs. Connolly Bros. of Manchester, joined the Selson Machine Tool Co., Ltd., of London as sales engineer and since 1919 represented various American companies in the sale of their equipment throughout Europe. Now managing director of James Day, Ltd. Member of The Wire Association.

IT will be seen that this method means that stoppages have to take place each time the lead container is empty to enable a fresh supply of lead to be poured in and a certain waiting period is necessary until the lead cools to the correct temperature.

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THE lead also, when forced through the Dieblock, has to mix with the residue lead already left in the block from the preceding charge and the oxide surface films collect on the weld causing weaknesses in the lead covering which in service breaks down. This, of course, is a serious factor and scores of patents on different forms of die chambers have been filed in an attempt to overcome this trouble.

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THEREFORE, this type of Press has the disadvantages of time wasted between each new charge of lead and trouble due to oxide films both at the joining of the new charge to the residue in the container and the mixture of new lead with the residue in the dieblock.

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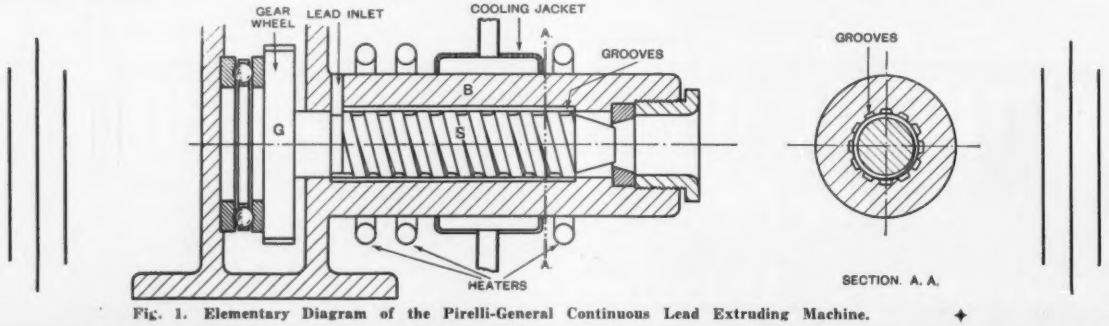

Fig. 1. Elementary Diagram of the Pirelli-General Continuous Lead Extruding Machine. ✦

THE next development in lead extrusion was the "Judge" Straight Through Press. This Press differs from the above types in so far as the molten lead is cast in a container around the cable and forced forward by means of a special concentric ram, so that the lead is always in the form of a special liner or huge pipe and is slowly reduced through dies to the required inside and outside diameter. This method, due to the absence of dieblocks, etc., claims to obviate most of the difficulties due to oxide film, etc., through providing an annular scarf weld instead of a butt joint between the different charges of lead, but nevertheless, still has the disadvantage of time lost due to recharging.

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FOR many years past, attempts have been made to extrude continuously instead of by the usual Hydraulic Press. As long ago as 30 years the use of a screw impeller type machine was suggested but no success seems to have followed this proposition.

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QUITE a number of arrangements have also been put forward in which molten lead is pumped by a series of reciprocating pumps into a common container where it is cooled and passed to the forming die.

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GEARED pumps have also been tried as a casting machine with some success, and a system in which a reciprocating plunger provides a semi-continuous extrusion through the annular space between the plunger and surrounding die has also produced lead piping. In the most successful of these experiments, however, it cannot be claimed that true continuous extrusion was effected.

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WE now have the **Henley** and the **Pirelli-General Continuous Lead Extrusion Presses,** both of which basically operate on the principle of the usual type of Rubber Extruding machines, but here molten lead is fed to the machine instead of rubber, and they are able to operate on a continuous basis.

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FROM the beginning, development of the Pirelli-General lead extruding machine was concentrated on a type capable of extruding 3″ diameter pipe. Development of the "Henley" machine was concentrated on a Press to extrude 1″ diameter tubing, and a number of both sizes of machines are in satisfactory operation.

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The Pirelli-General Presses

THE Pirelli-General machines have now been in commercial operation for approximately three years, and have extruded over 2,000 tons of lead on to cables for commercial working. They are used exclusively by Pirelli-General Cable Works, Ltd. for the most important supertension and telephone cables. The use of these machines has reduced the percentage of cables requiring to be stripped through lead defects to negligible proportions.

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THE Pirelli-General Press is made in three sizes, the largest will handle cables up to 5″ diameter, the medium size cables up to 3″, and the smallest cables up to 1½″. The largest machine will extrude up to 4 tons of metal per hour.

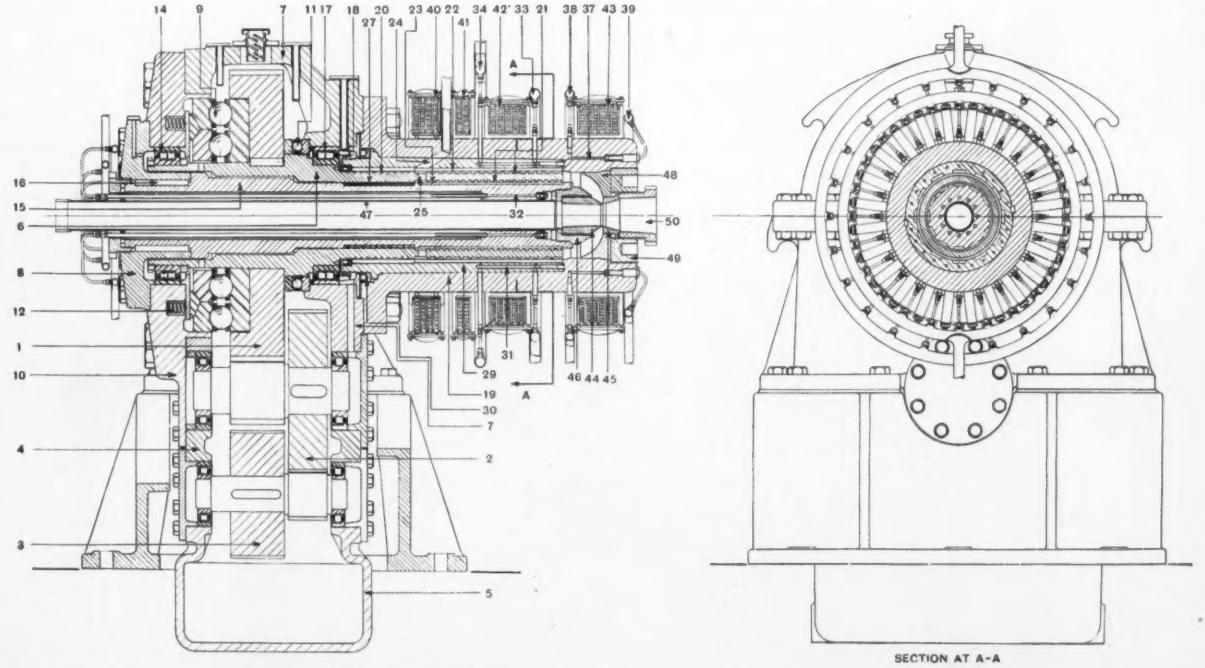

Fig. 2. Sectional View of the Pirelli-General Lead Extruding Machine.

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THE principle upon which the Pirelli-General machine functions will be readily understood from an examination of the elementary diagram (Figure 1). (S) is the steel screw driven by a gear wheel (G) revolving in the cylindrical barrel (B). The bore of the barrel is provided with a number of channels or grooves. Molten lead enters at the lead entry, this part of the machine being maintained at a suitable temperature by means of electrical heaters. The lead fills the longitudinal grooves and the threads of the screw. Owing to the presence of the cooling jacket the metal in the grooves becomes solid. As the screw rotates it tries to carry the lead along in its threads around with it, but owing to the friction between the lead and the threads and the solid lead in the keys, considerable resistance to retain is set up.

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AS the coefficient of friction between the lead and steel is less than between lead and lead, the lead spirally running in the threads of the steel screw is forced forward through the machine into the die chamber. The plastic lead is compressed to a homogeneous mass in the die chamber and forced out in the form of a pipe or alternatively lead covering over cable.

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IT will be realized that in the primitive form of machine described above, the die is carried by the revolving screw and must also revolve. The result is the pipe is extruded with a considerable twist which is not desirable, especially when used for cable covering. Considerable development was therefore necessary to produce the existing type of machine in which the dies were both stationary.

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FIGURE (2) shows a sectional view of the machine in its present form. The machine is driven by an electric motor and consisting essentially of a stationary tube through which the cable travels carrying a core die on one end and surrounded by a revolving hollow steel cylinder. This steel cylinder has screwed threads on its inner and outer surfaces which co-operate in a manner already described with the longitudinal grooves forming keys in the bore of the barrel and the outer surface of the stationary tube.

LEAD is admitted to the barrel and passes through ports in the revolving cylinder to the underside of the tubular screw as well as the outer side. Thus giving a double extrusion effect. The tubular screw is driven through a gear unit comprising of three pairs of gears made of hardened steel.

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AS the lead has to be maintained at a high temperature at the inlet point of the cylindrical casing, retainers are provided which prevents any lead flowing backwards. The retainers consist of a series of annular grooves cut on the revolving cylinder and stationary tube. The action of the retainers is assisted by a "chill" being provided by the lubrication on the bearings.

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TO obtain the correct temperature in the different sections of the casing, heaters and coolers are provided. The cooling arrangement consists of water channels, in the wall of the external chamber and in the wall of the stationary tube. The water used for cooling purposes is distilled or softened and flows in a close circuit formed by radiators and suitable tanks.

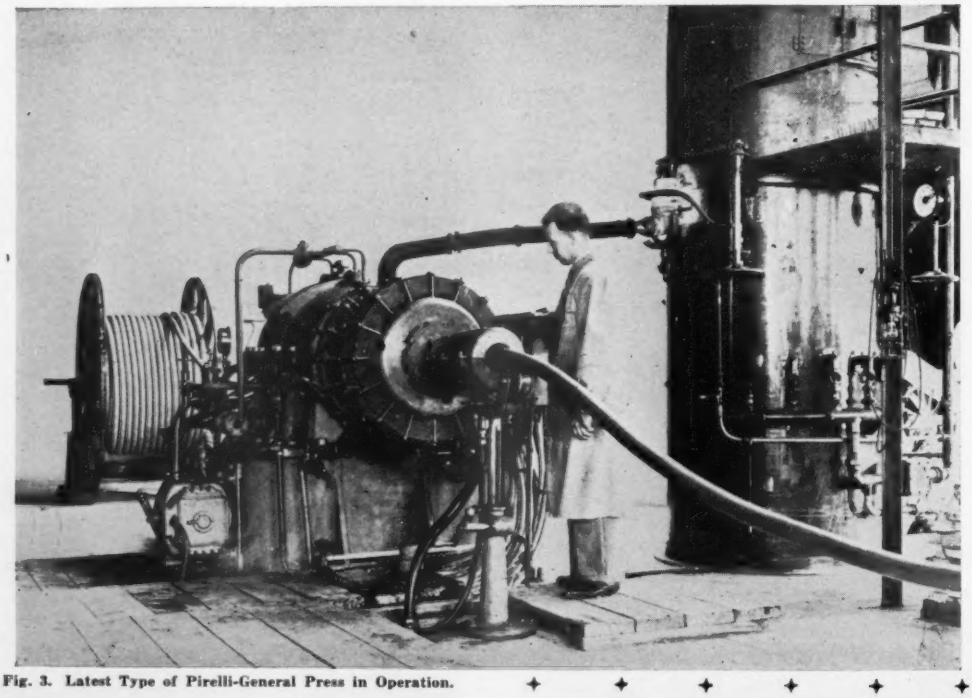

Fig. 3. Latest Type of Pirelli-General Press in Operation.

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THE initial heating of the machine is effected by means of three induction coils. During normal functioning of the machine the lead in the back portion of the extrusion chamber must be maintained in a molten state and the two back coils are used for this purpose. A tube insulated from the machine by an air - gap, protects the cable core while passing through the hot portion of the machine.

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THE operation of the machine is very easy. When starting up, the heating coils are energized and the barrel is brought up to a temperature of 300°C. The machine is then slowly turned over and lead is fed into the machine from the lead melting furnace which is either controlled by a supply valve, or by allowing the lead to melt or solidify in the connecting pipes between lead pot and the machine.

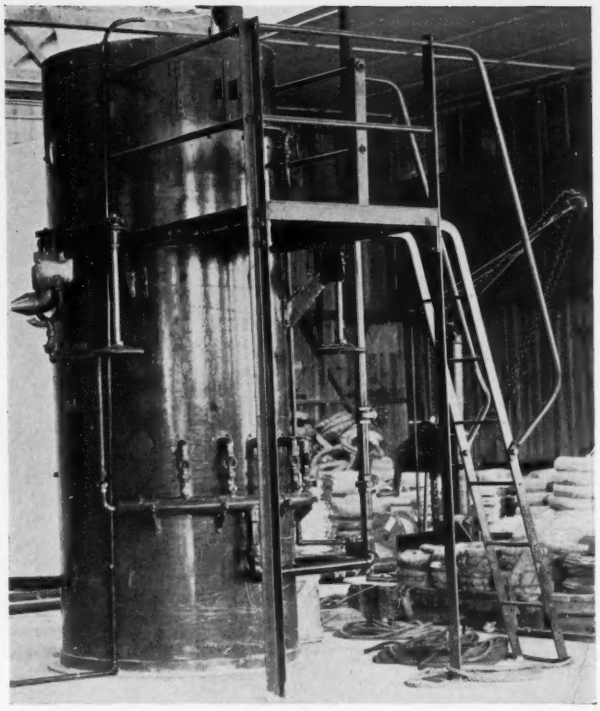

Fig. 4. Melting Pot.

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AS soon as the lead has access to the machine, a water cooling arrangement is put into operation in order to bring the lead to a plastic state so that the screw can then operate with same and extruding commences. The speed or production can be controlled by changing the degree of cooling, and once this has been set, the machine will continue to extrude so long as molten lead is fed to the machine.

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IN connection with this Pirelli - General Lead Extruding machine, a suitable lead melting pot which is of the vertical type, gas heated and thermostatically controlled, has been designed, having a capacity of approximately two tons. The molten lead is taken from this melting pot in such a way as to avoid any dross or other impurities to be drawn into the Press.

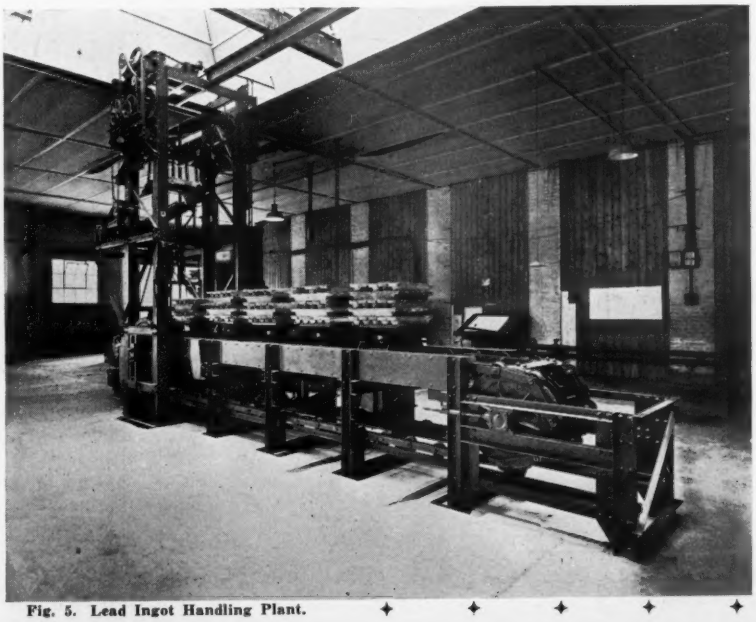

Fig. 5. Lead Ingot Handling Plant.

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TO feed the molten pot a lead ingot handling plant has been designed which automatically feeds the melting pot with the correct amount of lead as governed by any given output from the Press. Once the conveyor tables have been loaded with lead the plant is completely automatic. Arrangements are made whereby, if necessary, the melting pot can be loaded by hand.

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FIGURE 3 shows latest Pirelli Press in operation. Figure 4 shows the melting pot and Figure 5 the lead ingot handling plant.

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The Henley Press

THE development of the Henley Continuous Lead Extrusion Press has been going on since 1929. The first machine being of the vertical axis type.

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ONE of the earliest machines is shown in Figure 6. This is an open topped cast iron cylinder pot to which is fitted a hollow tubular point holder operating on a ball bearing, the point holder being fluted longitudinally on the outer surface. Surrounding the point holder is the impelling member consisting of a deeply dished cover for the pot with a long boss which is bored out internally with a very coarse screw thread. This cover is carried by a ball race on the rim of the pot and fixed to its upper face is a bevel gear

driven by a pinion to rotate it about a vertical axis. The cavity of the cover is fitted with an air cooling device operating on the screwed portion surrounding the splined point holder. The outer case contains the molten lead, which flows up into the space between the vertical fixed point holder and the surrounding screw thread.

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THIS early model using a ¾ H. P. motor successfully extruded lead pipe and in 1931 it was decided to make a larger type machine and to turn the axis into a horizontal direction to facilitate handling.

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IN this larger type machine the same principle was followed and the machine actually extruded many hundreds of miles of cable before the latest type machine was developed.

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MUCH experience was gained from this machine, such as the selection of special steels to withstand unusual conditions due to wide range of temperature, etc. and the machine in its final form now consists of two units. The upper part contains the main cast steel casing carrying back and front covers, lead impelling mechanism, molten lead chamber, point holder, driver with thrust bearing, and die adjustment machanism. The lower part is a cast tank base which in addition to housing the reduction gear holds oil used for the thrust bearing and the gearing generally.

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FIGURE 7 shows the machine in question and it will be seen from the right-hand view, the special driving feature of this machine is a balanced drive to the main impelling member through a double train of gearing, one on each side from the bottom shaft which is common to both. This enables the torque to be equally divided between the two trains of gearing, which ensures an even application of torque to the main driving wheel, thus eliminating any side thrust on the main impelling member, keeping it concentric with the point holder, thereby ensuring an even lead flow from the impelling members and at the same time reducing bearing wear to a minimum.

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CONSIDERABLE thought has been given to the design of the forming chamber on this machine as much depends on this particular part of the machine to produce lead covering with the uniformity of wall thickness. Many different types of forming chambers were experimented with before the one now shown was finally adopted.

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OTHER important features of construction not shown in the drawing now employed in the latest machines, but which are nevertheless very interesting, are the longitudinal variations of the depth of the thread and the fact that now these threads are on both members of the impelling mechanism.

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MENTION should also be made of the method adopted to form a high pressure gland to avoid escape of the lead through the space between the fixed and rotating members constituting the forming chamber. This difficulty has been overcome by the very simple device of providing threaded surfaces so that any lead entering the space is immediately engaged by the threads which provides the necessary back pressure to prevent further escape. The gland at the molten lead end of the rotating impelling member is sealed by the cooling water that is used for bringing the temperature of the lead down until it is in a suitable plastic condition. Both of these lead glands are entirely automatic in their action and are packingless. An important feature is that no bridges are used to support the point holder. The impelling threads of this member are brought out beyond the rotating impelling member just into the forming chamber to form a support.

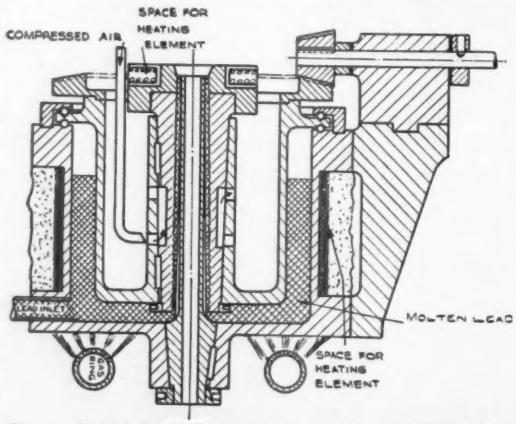

Fig. 6. One of the earliest continuous lead-extrusion machines which worked in 1929-30. On this machine lead pipe was first produced continuously in December, 1929. ✦ ✦

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THE heating of the machine is carried out by gas, or by electric immersion heaters inserted into the machine in the regions where the heat is required, thus obtaining economy and a high efficiency. The drive of this machine is taken care of by a combination of Ward Leonard and Shunt control.

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IT will be appreciated that the use of Continuous Lead Extrusion Presses opens up the question of improvements in connection with the melting furnaces. In the case of the ordinary hydraulic Press, large quantities of molten lead are required each time the container is filled, whereas with the Continuous Press lead need only be melted and supplied at the same rate as that at which the finished lead covering is extruded from the machine. Consequently a smaller size lead pot can be used which obviously means economy in heating, etc. In connection with the Henley Press, a Continuous Lead Melting Furnace with automatic feeding magazine and elevator has been developed. Figure 8 shows the general form of this furnace.

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THE furnace tube proper is of D section set up on steel support at an inclination of approximately 45° and is divided

into three portions as follows: — An entrance lock between two gas-tight doors, a central portion where the billets of lead slide down one after another into the molten metal and a lower chamber where the temperature of the lead is controlled on its way to the Extrusion machine. The lower end is connected to the machine by a valve which controls the flow of the lead or can be used alternatively for emptying the furnaces.

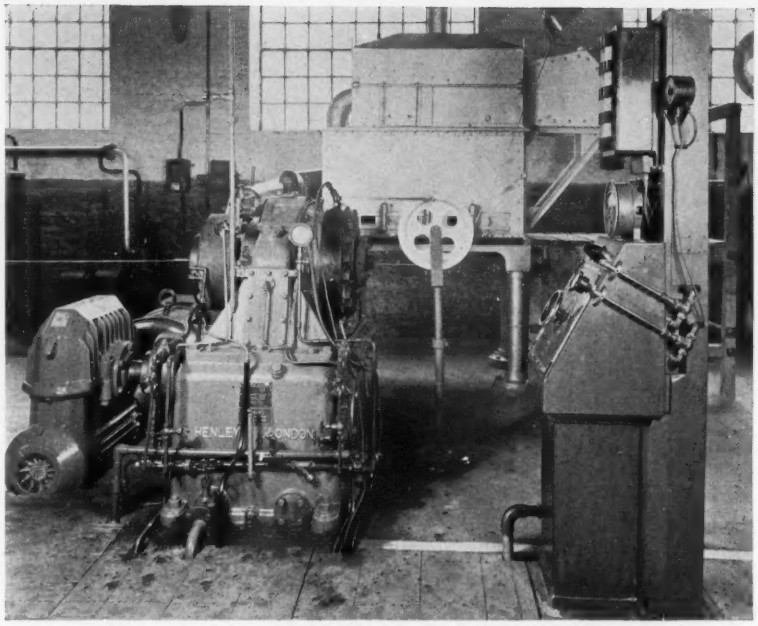

Fig. 7. Side View of Henley Machine Covering Small House Wiring Cable.

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TWO separate heating systems are applied to the container, an upper one for bringing lead billets to melting point and actually liquefying them and a lower one which heats the lower chamber. The final temperature of the lead is thermostatically controlled through the supply of head (electric or gas) by means of an immersion thermostat. The amount of lead admitted through the entrance lock at the upper end of the furnace is controlled by the level of the lead in the furnace. When the level drops the elevator motor is started by an automatic switching arrangement and a lead billet is carried up to the furnace; on its way to the top a switch or air cock is operated, which in turn opens and closes the admission door either electrically or mechanically according to the method of operation, allowing the billet which is in the entrance lock to pass into the molten metal. On reaching the top the lead billet is discharged into the entrance lock operating a switch which reverses the elevator motor bringing the elevator tray to the bottom position.

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THIS furnace is fitted with a billet handling plant in the form of a magazine carrying up to 20 billets, which discharges automatically into the elevator. This in turn feeds the furnace as and when more lead is required. Apart from the filling of the magazine with the lead billets, everything else operates automatically. The lead melting furnace is completely sealed by inert gas so that when melting takes place no oxide formation will occur. Any oxide or dirt that may be carried into the furnace by the lead billets can be removed by an automatic gas-sealed skimming device.

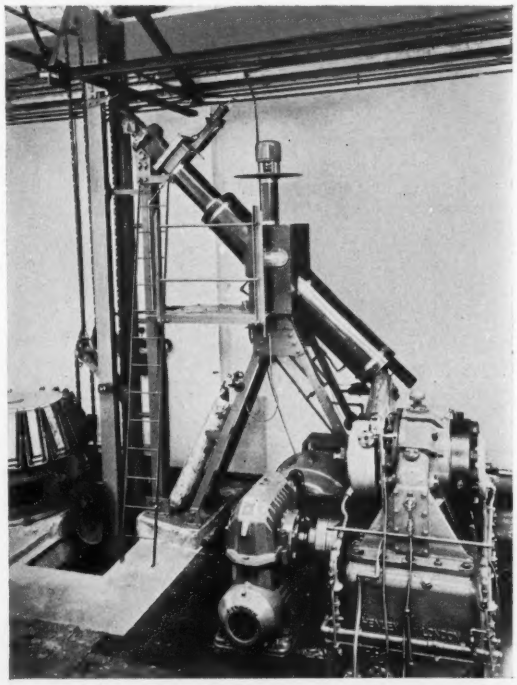

Fig. 8. Side View of Henley Machine and Lead Melting Furnace.

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IT will be appreciated that with continuous extrusion the handling of the cable as it leaves the Extrusion machine is an important problem as obviously inefficient reeling up may easily interfere with the full advantage of the continuous process.

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THE method adopted in connection with the Henley Press is really quite simple, a measuring wheel being situated between the Extrusion machine and the reel, such measuring wheel being driven by the cable as it leaves the machine.

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THIS measuring wheel is connected to the take-up drum through a differential device. This arrangement corrects the speed of the take-up motor through electrical contacts so long as there is any difference between the speed of the cable going on to the drum and the speed of the cable as it leaves the Extrusion machine.

✦ ✦ ✦

FIGURE 9 shows the complete lay-out of the Continuous Lead Extrusion

(*Please turn to Page 446*)

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*Hot Coating Steel Wire With Aluminum

By Robert J. Snelling and Edmund T. Richards

COATINGS of aluminum on steel wire have usually been electrolytically applied out of a solution of the halides (chlorides or bromides) in benzene, toluene, or xylene. Coating out of a molten bath involves, in addition to numerous small problems, the major difficulty that aluminum oxide, which forms upon the hot metal with great ease, prevents a good bond, and causes the aluminum to scale off in the bend test. In theory, aluminum carbide should form also, but observation shows that this occurs only under unusual circumstances. At the working temperature, (1300° to 1500° F) and at usual hot plating speeds, the amount of carbide formed from carbon extracted from the wire surface is negligible. It may be assumed that any weakness of the bond is due solely to contamination of the wire surface with aluminum oxide, formed by the reduction of iron oxide present as an impurity on the steel surface.

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ORDINARILY this formation of aluminum oxide is unavoidable. When steel wire emerges from an inhibited 5% pickle of sulphuric acid, it takes on instantaneously a film of iron oxide so thin that it does not affect the appearance of the wire; it is absolutely invisible. Nevertheless this film, through the interchange of oxygen between the two metals, makes a good metallic bond impossible. This exchange of oxygen, which is inevitable in the case of red-hot fluid aluminum because the affinity of aluminum for oxygen is twice its affinity for iron, also causes the formation on the wire surface of a film of metallic iron in particles of almost atomic fineness. This freshly reduced iron is eager to combine, and does so with the neighboring aluminum, but the resulting alloy is not the normal, adherent malleable alloy resulting from a normal fusion of the two metals. We shall speak of this alloy later.

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IN order to get a satisfactory coating of aluminum from a molten bath, this oxidation of aluminum must be prevented; that is, the steel wire must enter the bath entirely free from surface contamination with iron oxide. Various measures have been tried to secure this result, notably the use of inhibited acids and immediate drying, and the passage of the wire through a molten salt of reducing properties. Mechanical cleansing methods have been explored also, such as cleaning by revolving wire brushes. Mention should also be made of the use of highly reducing gases at high temperature, whose effect is to eliminate oxides just before the wire enters the molten metal. Hydrogen and carbon monoxide have been used in this way.

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ANOTHER process tried involved the passage of the bare wire through a molten bath capable of reducing iron from its oxide. This showed considerable promise; if properly carried out it delivers the wire to the aluminum perfectly clean and protected by a film of the bath material, but of course this must be a material which does not react with molten aluminum, since it will float on top of the kettle. It may be necessary to keep it away from the exit end of the kettle by a dam reaching about two inches above and six inches below the bath surface.

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IN America recently, work has progressed along the lines just described, that is the use of a reducing gas to clean the surface, and good success has been secured by the use of hydrogen. Its strong point is that the steel absorbs it and does not give it up until the steel has reached the aluminum bath. Hydrogen is a very powerful deoxidizer; its heat of reaction with oxygen at 75°F., 10.33 calories, being 33% higher than that of aluminum, and more than twice that of iron.

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THE absorbtion power of iron for hydrogen increases with temperature, and as its protection is essential from the hydrogen chamber to the bath, operating temperatures must be chosen to secure this protection as well as to avoid mistreatment of the steel. In Dr. Colin Fink's process called "alplate," the hydrogen treatment takes place at 1800°F. As the wire leaves the hydrogen chamber its temperature begins to fall, and hydrogen escapes, but enough remains to protect the wire against aluminum oxide which is always present despite the utmost care.

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AN incidental advantage of the hydrogen process is that at 1800° the gas tends to combine with the normal impurities of steel, carbon, sulphur, dissolved oxygen, etc., and to remove them as methane, hydrogen sulphide, and steam. These impurities would otherwise tend to hinder the penetration of the steel by hydrogen, and to prevent the formation of a good malleable bond. Their elimination promotes flexibility in the bond. ✦ ✦ ✦

AS in all coating processes, this aluminum coating of steel gives rise to a bonding layer, which is claimed to be not a definite compound but a solid solution of iron in aluminum, richer or poorer in iron according to circumstances. Whether this is true is yet to be demonstrated, as ordinary chemi-

(*Please turn to Page 442*)

***An article translated from March, 1939, Draht-Welt by Kenneth B. Lewis, Consulting Wire Mill Engineer, Worcester, Mass.**

WIRE ASSOCIATION CONVENTION PROGRAM, Chicago, Illinois, October 23-27, 1939

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
10:30 A. M.	DIRECTORS' MEETING	**FERROUS DIVISION** "ELASTICITY OF SPRING WIRE" George Nelson L. A. Young Spring & Wire Corp. Detroit, Michigan FILM—"MANUFACTURE OF SWEDISH STEEL RODS" Uddeholm Company of America New York, New York **NON-FERROUS DIVISION** "COATING WIRE WITH PAPER PULP" J. S. Little, Manufacturing Engineer, Western Electric Company Kearny, New Jersey "THE BRAZING OF COPPER" L. L. Wyman, Research Engineer General Electric Company Schenectady, New York	**FERROUS DIVISION** "ATMOSPHERIC ANNEALING OF STEEL WIRE" Dr. Allan Bates, Manager Chemical & Metallurgical Division Westinghouse Electric & Mfg. Co. East Pittsburgh, Pennsylvania "MANUFACTURE & USE OF STAINLESS STEEL WIRE" Stanley P. Watkins, Manager Rustless Iron & Steel Corporation Baltimore, Maryland **NON-FERROUS DIVISION** "ELECTRIC RESISTANCE WIRES" Dr. C. L. Mantell, Technical Director Wilbur B. Driver Company Harrison, New Jersey "MANUFACTURE OF WIRE SOLDER" Robert A. Gardiner, President Gardiner Metal Company Chicago, Illinois	**BOTH DIVISIONS** JOINT SESSION ACID DISPOSAL SYMPOSIUM	NATIONAL METAL CONGRESS SHOW
NOON 12 to 2	PROGRAM COMMITTEE LUNCH	OPEN 12 to 2	WIRE ASSOCIATION LUNCHEON MAJOR GEN. J. O. MAUBORGNE Chief Signal Officer U. S. Army — Guest Speaker —	OPEN 12 to 2	ALL
AFTER-NOON	**BOTH DIVISIONS** JOINT SESSION "CHARACTERISTICS OF MILD STEEL WELDING" J. C. Joublanc, Technical Director Harnischfeger Corporation Milwaukee, Wisconsin "BOULDER DAM — THE WORLD'S OUTSTANDING TRANSMISSION LINE" A Lecture with Motion Pictures. Dr. Donald M. Simmons, Chief Engineer General Cable Corporation New York, New York "SUBMERGED HEAT BY SUBMERGED COMBUSTION" Walter S. See Submerged Combustion Co. of America Hammond, Ind.	**BY BOTH DIVISIONS** VISIT TO HAWTHORNE WORKS Western Electric Company	WIRE ASSOCIATION ANNUAL MEETING THE MORDICA MEMORIAL LECTURE Dr. S. A. Braley, A.B., A.M., Ph.D., Industrial Fellow, Mellon Institute Of Industrial Research Pittsburgh, Pennsylvania	**BOTH DIVISIONS** VISIT TO REPUBLIC STEEL CORPORATION WIRE MILL	DAY
Evening	NATIONAL METAL CONGRESS	NATIONAL METAL CONGRESS	SMOKER	AMERICAN SOCIETY FOR METALS DINNER	NATIONAL METAL CONGRESS

Wire Association Plans For The 1939 Convention

ATTENTION is called to the program (on the opposite page) of the Wire Association Convention to be held at Chicago, Illinois, October 23-27, 1939.

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AS usual there will be a registration fee of $5.00 for those attending the technical sessions and meetings of the Wire Association. The only exception to this requirement is that members of the Institute of Metals Division of the American Mining and Metallurgical Engineers are invited to attend the non-ferrous sessions only, on Monday afternoon and Tuesday and Wednesday mornings as guests of the Wire Association. Members of that Society should register, however, at the Wire Association registration desk where they will be issued cards of admission for the session they desire to attend.

✦ ✦ ✦

Publication of Papers

ALL papers will be preprinted in the October, 1939 issue of **"WIRE & WIRE PRODUCTS"**, which will be in the hands of members and others desiring to attend the meetings, not later than October 10th. This will give sufficient time to study the subject matter prior to attending the meetings. The presentation of many of these papers will, in addition to the subject matter covered by the papers, be accompanied by motion pictures.

✦ ✦ ✦

Discussions

ALL papers are subject to open discussion and all discussions are recorded by a stenotype operator. After editing, these discussions will be published in the January 1940 issue of **"WIRE & WIRE PRODUCTS"**. It is customary at Wire Association Meetings for those participating in the discussions to furnish their names and official titles to the stenotype operator at the time of the discussion. If, however, a member does not wish his name to appear in the final printed discussions, he can request that the stenotype operator simply record his statements as being made by a "member".

✦ ✦ ✦

Major General Mauborgne Guest Speaker at Luncheon

TWO features of the program should be of general interest; First, the Wire Association Annual Luncheon which will be held Wednesday, October 25th at the Congress Hotel, Chicago, will have as guest speaker **Major-General Joseph O. Mauborgne,** Chief Signal Officer of the United States Army.

✦ ✦ ✦

IT will be recalled by those attending last year's luncheon that the guest speaker was **Colonel Louis Johnson,** the Assistant Secretary of War, who delivered a very stimulating and electrifying address. At that time, while it was not realized by members of the Wire Association, the address by Colonel Johnson was the opening of the National Industrial Preparedness campaign of the Government which has resulted in the present great rearmament program for the United States.

✦ ✦ ✦

THIS year, General Mauborgne will present to us some definite information as to how, when and where the wire industry fits in this armament picture. Since the Signal Corps of the Army is charged with the procurement of practically all wire for military purposes, his talk should be of real value and interest to us. This luncheon is open not only to members of the Wire Association and their guests but to all members of the other cooperating societies of the National Metal Congress.

✦ ✦ ✦

Dr. Braley to Deliver "Mordica Memorial Lecture"

A NEW feature is the **"Mordica Memorial Lecture"**. This lecture was established in 1938 by the Board of Directors as a memorial to the late John Mordica, first president of the Wire Association, and the honor of delivering the initial lecture rests with **Dr. S. A. Braley,** A.B., A.M., Ph.D., Industrial Fellow, Mellon Institute of Industrial Research, Pittsburgh, Pennsylvania. The title of the lecture will be announced just prior to the Convention.

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Plant Inspections

THERE will be two plant inspections this year, both held in the afternoon. The first will be to the **Hawthorne Works of the Western Electric Company** on Tuesday afternoon with buses leaving the Congress Hotel promptly at 1 P. M. The second, a visit to the **Republic Steel Corporation's** Wire Mill, on Thursday afternoon; the time to be announced later.

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IN connection with these plant inspections, only American citizens will be permitted to visit the plants except in such cases where special arrangements can be made. Consequently all Canadian, British and other foreign members of the Wire Association, desiring to inspect these plants, must have their applications for such permission in the hands of the Secretary of the Wire Association not later than September 15, 1939. The Secretary will then submit these names to the proper official and, if possible, arrange for the necessary permits.

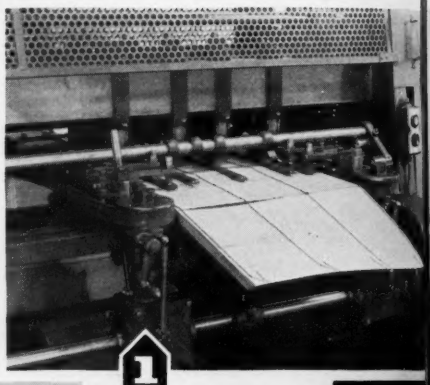
✦ ✦ ✦

Transportation

THE Show of the National Metal Congress will be held in the International Ampitheater, which

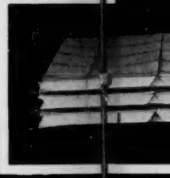
(Please turn to Page 431)

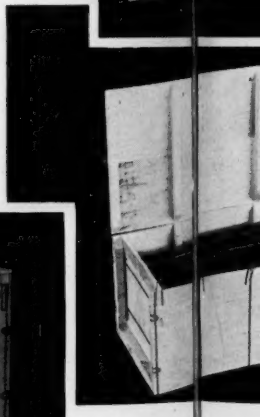
BOX
A ~~CHAIN~~ IS N S

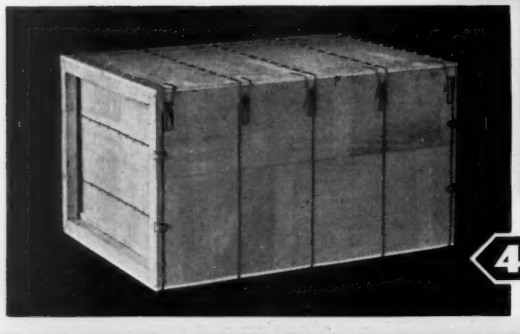


1

Complete side sections of All-bound boxes are seen emerging from a 4-One Box machine above.







4

Securely fastened ready to g
this Pittsburgh rd, all-boun
box can be co on to deliv
its contents saf

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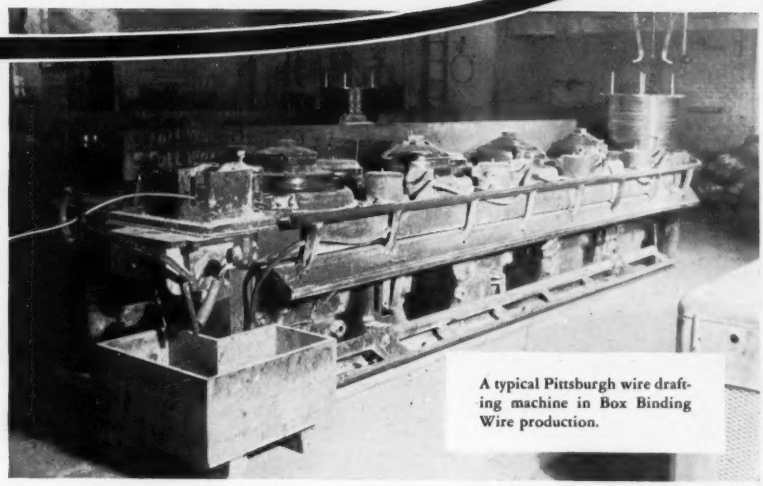
RE

Pittsburgh BOX BINDI G AND STAPLI G

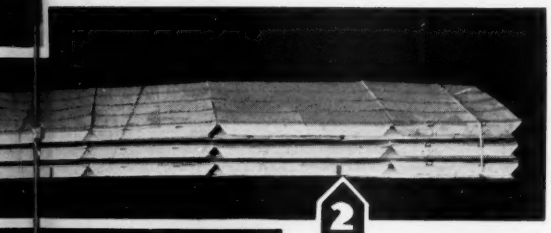
Each grade of Pittsburgh Box Binding and Stapling Wire is carefully tested and rigidly inspected. The Rockaway Wire Tester, standard testing device of the Package Research Laboratory, is constantly employed for your protection. All Pittsburgh Box Wires must meet or better the allowed tolerances for Box Machines.

BINDING WIRE STRONGER THAN ITS WEAKEST LINK

PITTSBURGH BOX BINDING AND STAPLING WIRE IS ROCKAWAY TESTED TO EQUAL OR SURPASS REQUIRED SPECIFICATIONS



A typical Pittsburgh wire drafting machine in Box Binding Wire production.



2

All-bound boxes ready for assembly or for flat shipment or storage.

3

An assembled and loaded All-bound box ready for shipment except for fastening cover.

...ready to go, ...rd, all-bound ...on to deliver

Absolute *uniformity* of the prescribed physical properties of Box Binding and Stapling Wires is essential for trouble-free operation in wire bound Box Machines. Beginning with the furnace charge, *Pittsburgh* has developed an improved procedure in Box Wire manufacture that results in a uniform and extraordinarily high yield of these required physical properties. Uniformly smooth surface (to prevent wear in machines), uniformly accurate gauge (to fit mechanism), uniformly correct stiffness (to drive and form properly), are assured by Pittsburgh's *controlled* manufacture. Pittsburgh's usual rigid tests and inspection are supplemented by standard Rockaway Tests for Box Binding and Stapling Wires.

PITTSBURGH STEEL COMPANY

1641 GRANT BUILDING, PITTSBURGH, PA.

...G Wire ...G

AND A COMPLETE WIRE LINE FOR ALL OTHER FABRICATING NEEDS

P

Wire Association Questions and Answers

Question No. 6000

We find it extremely difficult to remove from the wire which is to be galvanized the coat (wet rust), lime and soap, which is necessary to facilitate the drawing process, and save wear on dies, etc.

We would like to find a solution, or a system, which will enable us to leave the coat and soap on the wire until it is ready for galvanizing, but which will remove it as the wire moves forward off the swifts into the galvanizing bath.

✦ ✦ ✦

Answer No. 1

NOTE—wet rust unnecessary with tungsten carbide dies. Best process is perhaps use of lead bath which will scale the surface. Clean the surface in either sulphuric or muriatic acid.

✦ ✦ ✦

Answer No. 2

WE have not been processing galvanized wire. However, there are several methods that can be used if this is a real problem such as a solvent degreasing tank or an alkaline cleaner of some sort.

✦ ✦ ✦

Answer No. 3

IT would appear from the explanation under this question that the party is trying to galvanize wire without lead annealing or cleaning before galvanizing.

If the physical properties of the wire are such that the wire can be lead annealed to burn off the grease and soap, no difficulty should be encountered if the wire is treated after lead annealing with a 10 to 15 per cent hot muriatic acid solution or a concentrated cold muriatic solution.

In case the physical properties desired will not permit lead annealing, it would be our suggestion that the wire be drawn without a sull coat (wet rust) and that it be passed through a hot alkaline solution (tri-sodium phosphate) to remove the drawing lubricant, and then either through a hot or cold muriatic acid solution.

✦ ✦ ✦

Answer No. 4

USE Lead Pan to burn off soap, etc.

✦ ✦ ✦

Answer No. 5

THE extent of the rust, lime and soap determines the magnitude of the cleaning problem. As a suggestion, the cleaning may be carried out by using a basic metal cleaner followed by immersion in acid. The cleaner breaks down the soaps, and the acid removes the lime and rust. Sulphuric acid may be tried, but if the amount of lime is excessive, hydrochloric acid may be necessary.

✦ ✦ ✦

Answer No. 6

WE pass wire through a lead bath on the way to the molten zinc bath.

✦ ✦ ✦

Answer No. 7

IN our normal practice we encounter no difficulty from this source, (since all our wire for galvanizing runs through some type of annealing equipment) but suggest the use of some degreasing or alkaline solution between the "swifts" or galvanizing bath.

✦ ✦ ✦

Answer No. 8

WE would suggest the usual alkali cleaning process for the removal of soap and oil from the wire. The immersion in muriatic acid immediately preceding the galvanizing should serve to remove any lime or any soap coat.

✦ ✦ ✦

Question No. 6001

We understand that there has been a new process invented for coppering, which takes only a quarter of the time previously taken by the Cyanide process.

In this process, currents at very high density are used, and for wire this averages between 100 and 200 amps. per square foot.

Can you tell us what firm has developed this process, who is using it, and whether we could get in touch with them?

✦ ✦ ✦

Answer No. 1

E. I. DuPont DeNemours & Co., recently announced a new high speed copper plating process. They claim that with this process it is possible to plate bars and wire with a coating .001" to .003" thick in ten to twenty minutes.

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Answer No. 2

THE mentioned process is being used but the writer does not know of an installation in the wire industry. However, as an alternative, an application of the mentioned process is being used on strip at the Thomas Steel Company, Warren, Ohio. There are probably many other firms using this process.

✦ ✦ ✦

Answer No. 3

THE electrolytic theory of metal deposition other than the cyanide process in copper coating has been investigated but we do not know of any specific firm using or developing it. Some more definite information may be available from Dr. Colin G. Fink, Consulting Engineer, New York City.

✦ ✦ ✦

Answer No. 4

A GREAT deal of interest has developed in the CUPRODINE process for coating wire and flat steel by a simple immersion process. Cuprodine is being used regularly in a number of the wire mills.

The data following will show the procedure followed in wire mills.

The coating, you should remember, is one deposited by a simple immersion process. It may not be quite so smooth as that developed electrolytically, but due to its cheapness and ease of application, it may be of a great deal of interest to the inquiring member, as to the others.

CUPRODINE is a crystalline chemical that is used instead of the ordinary copper salts for applying a coating of copper by simple immersion to wire, and to other products where such coatings are required.

While it is used in much the same way as ordinary copper salts, it has the advantage of producing denser, more adherent and more lustrous coatings.

Operations:

(1) After pickling and rinsing the surfaces to be copper coated, they are then immersed in a solution consisting of 3%—66° Be. sulphuric acid in water. Four to six ounces of CUPRODINE are added for each gallon of this 3% sulphuric acid solution.

(2) The bath is heated to 150° F.

(3) The time to complete the coating will range from 10 seconds to one minute. After the coating is completed, the coated surface is rinsed in cold water and then dried.

When the coating becomes thin, or the time to complete the coating becomes too great, the composition of the bath must be investigated, and the proper ingredients restored.

For restoring used baths:

First—Titrate the solution for its sulphuric acid content and restore this. The presence of the copper will not materially affect the titration, although the acid concentration will appear a trifle higher due to the combined acid in the CUPRODINE solution.

Second—If, after the acid solution has been restored to its proper strength, the coating is still thin, add perhaps from three to four ounces of CUPRODINE per gallon. This should put the bath in suitable condition.

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Question No. 6003

No two manufacturers seem to agree as to what type of finish or coating is the best on round, low and medium carbon steel wire stock for cold heading work.

It, therefore, seems that it would be a matter of real interest to both the mills and the fabricators to determine, if possible, the best all-around finish (for run-of-the-mill heading wire), odd and special work not to be considered.

✦ ✦ ✦

Answer

AS a result of the above question a questionnaire was submitted to a number of wire mill superintendents and metallurgists and the following tabulation, with several accompanying comments gives the replies.

The Wire Association is for the specific purpose of improving production methods. It is organized as a clearing house of ideas on technical problems and research work in all phases of practical wire drawing and wire working.

The inquiries discussed are received from and answered by members of the Wire Association. These inquiries are sent to the Secretary of the Association who acts as a central clearing point, and neither the names of the firms nor individuals sending in the inquiry, nor of the men or firms replying are divulged without permission.

Wire Association Questions & Answers

Answer No. 1

IT appears to us that this question should be answered by the cold heading manufacturers. We have customers producing the same part, one who takes a sull coated wire and the other who takes a lime bright wire.

It has been our experience that where possible the wire should be given a light draft. The lime should be applied hot so as to produce a more uniform lime coat.

It has been our experience that the metallic soaps produce a coating on the wire which will give better die life than other types of lubricant.

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Answer No. 2

THE answer to this problem may be partially obtained from the article "Some Characteristics of Wire and Their Relation to Cold Heading", Page 521, Wire and Wire Products, October 1938.

In regard to the drafting, standard practice in the Cold Heading industry is to draft the rod about 1/32 inch. On processed material a suitable coating for cold heading may be obtained from .015"-.020" draft.

Three or more heavy drafts will materially increase the properties of the wire to a point where it is extremely difficult to cold head. It would be recognized as very poor wire mill practice for producing cold heading wire. The only place additional drafting is recommended is in producing small wire sizes from No. 5 or No. 4 rod. In that case, extreme care must be taken to eliminate the possibility of raising the properties of the wire to a point where it will not cold head.

✦ ✦ ✦

Answer No. 3

THIS question and the answers thereto will unquestionably be of a great deal of interest to both producers and consumers. In answer to question (2), lime coat (a), we favor the use of light lime where the wire is to be used on straight work or for single extrusion, or heavy for double extrusion. It seems to be, in the opinion of some, that it is very desirable to start from the front of the coil in heading—that is to say, heading the coil in the same direction that it is drawn, and the opinions in this direction might be of interest to have incorporated when dealing later with this subject of wire for cold heading work. We will look forward with interest to results of replies to this questionnaire which we presume you will give some prominence to in some future, and we hope early issue, of Wire & Wire Products.

The Wire Association is for the specific purpose of improving production methods. It was organized as a clearing house of ideas on technical problems and research work in all phases of practical wire drawing and wire working.

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Answer No. 4

THE success produced with the Therm-oil-GRANODINE process of the American Chemical Paint Co., of Ambler, Pa., in preventing wear on friction surfaces and at the same time very successfully retarding rust, has encouraged us in the belief that this process may serve as a means of coating wire for many purposes. It is perhaps a little soon to talk too much about this at the present time.

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EDITOR'S NOTE

This question with the consolidated replies is unquestionably one of extreme interest both to rod and wire producers and to consumers. Further comment and criticism is invited as to this problem from our readers.

	One or Two Drafts Light Drafts						Three or more Drafts Heavy Drafts					
	I	II	III	IV	V	VI	I	II	III	IV	V	VI
1. Sull Coat a) Undesirable	x			x		x				x		
b) Desirable			x		x		x		x			
(1) Light			x		x		x					
(2) Heavy								x	x	x		
2. Lime Coat a) Light	x	x	x	x		x-N1						
b) Heavy						x-N2	x	x	x			
3. Application of Lime Coat	N-3											
a) Hot	x	x	x	x		x	x	x	x	x		
b) Cold	x											
4. Type of Lubricant												
a) Grease				x	x							
b) Soap	x											
c) Metallic Soaps	x	x	x			x	x	x	x			
d) Others	x											

Note 1. Answer VI. Lime Coat 2 (a) —"light" for straight work or single extrusion.

Note 2. Answer VI. Lime Coat 2 (b) —"heavy" for double extrusion. Answer VI. "In addition to the two notes above, it seems to be in the opinion of some that it is very desirable to start from the front of the coil heading, that is to say, heading the coil in the same direction that it is drawn."

Note 3. Answer I. Lime Coat. "Use only very light single hole drafting for very bright finish. Not generally applicable due to rusting.

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Plans for the 1939 Convention

(*Continued from Page 427*)

is some distance from the downtown hotel area of Chicago. The American Society for Metals is making arrangements at the present time to operate buses on regular schedule from the Palmer House and the Congress, Blackstone, and Stevens Hotels to the International Ampitheater and arrangements for bus transportation for our plant inspections at a nominal fee are now also being made.

✦ ✦ ✦

Technical Meetings of the Wire Association

ALL meetings of the Wire Association, both technical and non-technical will be held at the Congress Hotel, which will be Wire Association headquarters.

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IN addition to the regular meeting rooms, the Wire Association will have a suite of rooms in the Hotel designated as "official headquarters", where members of the Association can, as in the past, make their headquarters. Announcement of the room numbers will be on the bulletin board in the Hotel during the Convention. These rooms will be open from 9 A. M. to 11 P. M. daily.

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Smoker

THE Annual Smoker of the Wire Association will be held on Wednesday, October 25th at 7:30 P. M. in the Congress Hotel. Mr. A. R. Zapp of the Firth Sterling

(*Please turn to Page 436*)

Outstanding Personalities of the Wire Industry

Donald M. Simmons, Chief Engineer, General Cable Corp.

DONALD M. SIMMONS, chief engineer, General Cable Corp., New York, has been awarded an honorary degree of doctor of engineering by Princeton university for his achievements in the electrical industry. He graduated from Princeton in 1911 with the degree of A.B. and received his E.E. degree there two years later. He has been in the electric cable field more than 25 years, except for two and one half years in the army, during the latter part of which period he served as a major on the staff of General Pershing.

✦ ✦ ✦

Thomas N. Berlage, Director of Sales, Corronizing Division, Standard Steel Spring Co.

THE appointment is announced of **Thomas N. Berlage** as Director of Sales for the Corronizing Division of the company. Corronizing is a new process for coating steel for corrosion protection.

✦ ✦ ✦

MR. BERLAGE will assume his new duties with a rich background of sales experience with the Standard Engineering Company and the Shell Oil Company. He is a graduate of the Massachusetts Institute of Technology where he earned the degree of Bachelor of Science in Chemical Engineering. He is 38 years of age. His hobby is an 80 acre farm near Chicago.

✦ ✦ ✦

Henry T. Lintott, General Supt., Torrance Plant, Columbia Steel Co.

THE appointment of **Henry T. Lintott** as General Superintendent of the Torrance Plant of the Columbia Steel Co., located at Torrance, California, has just been announced.

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BORN in Visalia, California, Lintott studied mechanical and electrical engineering at the University of Nevade. From 1917 to 1922 he served as Assistant Chief Electrician of the Pacific Coast Steel Corp. at South San Francisco. In 1923 he become Chief Electrician of the Western Pipe and Steel Company at South San Francisco. From 1923 to 1927 he again became associated with the Pacific Coast Steel Corporation as Chief Electrician and Electrical Engineer. For the next year, until 1928, he was affiliated with the Lincoln Electric Company of San Francisco. In 1928 Lintott joined Columbia Steel Company as Chief Electrician of its Torrance Plant where he became Assistant General Superintendent in 1929.

✦ ✦ ✦

REPLACING **Mr. Lintott** as Assistant General Superintendent will be **O. A. Kresse,** former Superintendent of the Open Hearth Department of the Torrance Plant.

✦ ✦ ✦

Charles S. Redding, President, Leeds & Northrup

MORRIS E. LEEDS, founder and president of the Leeds & Northrup Company, is assuming the position of Chairman of the Board of Directors, and **Charles S. Redding,** Vice-President in Charge of Research and Engineering, becomes President, in an expansion of the Company's executive set-up effective July 10. Chairman of the Board is a post newly created to facilitate Mr. Leeds' participation in policy matters with which he will continue active.

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THIS promotes to the presidency of the Company one who has spent with it almost his entire business life. Mr. Redding took his first position with Morris E. Leeds & Company, predecessor of the present firm, for 15 months between high school and college. Receiving a B.S. in E.E. from the University of Pennsylvania in 1906, he spent 2 years as instructor in mechanical engineering there, and was briefly associated with the Engineers Club of Philadelphia. He rejoined the Company in 1909, by which time it had become Leeds & Northrup Company, and has since held executive positions in every division of its activities. He became second vice-president in 1918, was treasurer from 1922 to 1924, and became vice-president in charge of research and engineering in 1928.

✦ ✦ ✦

MR. REDDING is a director of the Philadelphia Manufacturers' Mutual Fire Insurance Company, and a member of American Physical Society, Franklin Institute, A.I.E.E., and American Association for Advancement of Science. He has served the Community Fund of Philadelphia and vicinity as a director, and has other avocations in public welfare.

✦ ✦ ✦

Ralph H. Pauley, President, Pittsburgh Tool Steel Wire

PITTSBURGH Tool Steel Wire Co. has appointed **Ralph H. Pauley** president, succeeding Alfred Stengel, deceased. Mr. Pauley has been vice president and treasurer of the company for several years. He retains his position as treasurer.

✦ ✦ ✦

Frederic M. Darner, Assistant Chief Engineer, Republic Steel Corporation

PROMOTION of **Frederic M. Darner,** chief engineer of Steel & Tubes, Inc., to the newly created position of assistant engineer of the Republic Steel Corporation announced. His duties will be concentrated chiefly on the problems of the corporation's subsidiaries and divisions.

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A GRADUATE of Case School of Applied Science in 1922. Mr. Darner worked with American Rolling Mill Co., at Zanesville and Middletown, O., and as chief engineer of the Erie Malleable Iron Company, at Erie, Pa. He has been with Steel & Tubes, a Republic subsidiary, since 1933, first as plant engineer of the Cleveland plant, then for the last five years as chief engineer over all plants of Steel & Tubes, Inc.

Exports and Imports of Wire

Exports of Iron and Steel Wire Products in May 1939 and May 1938
(In gross tons)

	MAY 1939	APRIL 1939	MAY 1938
Wire rods	1,881	1,791	2,098
Strip steel	5,580	4,327	4,107
Plain or galvanized iron or steel wire	3,537	3,728	3,760
Barbed wire and woven wire fencing	3,857	3,866	2,617
Woven wire screen cloth	146	164	220
Wire rope	262	511	362
Other wire and manufactures	542	629	494
Insulated wire and cable iron or steel—see analysis below			
Wire nails	1,528	1,426	1,788
Tacks	20	26	17
Other nails including staples	305	254	445
Bolts, machine screws, nuts, rivets and washers	645	722	739
Total, these 11 classifications	18,303	17,504	16,647

Imports of Iron and Steel Wire Into the United States
(In gross tons)

Concrete Reinforcement bars	275	596	152
Hollow bar and drill steel	168	75	24
Wire rods	863	638	461
Barbed wire	1,829	1,815	727
Round iron and steel wire	116	139	134
Telephone and telegraph wire	....	1	....
Flat wire and steel strips	313	264	161
Wire rope and strand	143	296	150
Other wire	132	213	124
Hoops and bands	2,061	1,549	2,140
Nails, tacks and staples	621	1,419	568
Bolts, nuts and rivets	17	7	9
Total, these 12 classifications	6,538	7,012	4,650

Exports

AT 147,760 gross tons export shipments of iron and steel products (excluding scrap) in May were 4 percent smaller than in April when this trade had totalled 153,884 tons. A year ago—in May 1938—this trade had amounted to 166,308 tons. May exports, according to these data, were valued at $11,661,926 against an April valuation of $12,245,537 — both higher than the $10,894,674 trade of May 1938.

✦ ✦ ✦

OVER the first five months of 1939, 733,307 tons of iron and steel valued at $56,464,410 have been exported in comparison with 967,397 tons valued at $64,517,991 in the comparable period of 1938.

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IMPORTS of iron and steel products into the United States in May totalled 24,171 gross tons against 41,314 tons in April and 20,419 tons in May 1938. Imports for May were valued at $1,405,883 against $2,703,290 for April and $1,160,068 for May 1938.

THIS trade amounts to 132,141 tons valued at 8,553,654 for the first five months of 1939 as compared with 102,242 tons valued at $6,386,341 for the same period of 1938.

✦ ✦ ✦

Scrap Exports

AT 384,881 tons valued at $5,638,013 scrap exports were sharply up as compared with the April figures of 240,124 tons valued at $3,595,271 and compared favorably with the May 1938 trade of 374,320 tons valued at $5,520,068.

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OVER the elapsed five months of 1939 only 1,390,064 tons of scrap have been exported as compared with 1,636,247 tons in the comparable period of 1938—a decline of 15 percent. 1939 exports were valued at $20,570,577 and those of 1938 at $26,384,363.

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The Export Trade

MORE non-alloy "other" plates were exported in May than any other product—20,611 tons including 5,946 tons sent to Sweden, 5,711 tons dispatched to the Netherlands, and the 2,052 tons which went to Italian buyers. Shipments of non-alloy black steel sheets were also large—18,761 tons—and found their principal destinations in Canada, 3,306 tons; the United Kingdom, 2,913 tons; and Brazil, 2,300 tons. The Netherlands, 2680 tons; Brazil 2,095 tons, and the Philippine Islands, 1,526 tons; were the larger outlets for the 16,124 tons of tin plate exported, while Japan was the outstanding buyer of both non-alloy "other" steel bars and of non-alloy steel ingots.

✦ ✦ ✦

CANADA was the chief purchaser of American iron and steel products in May, her 18,893 ton total including such items as 3,306 tons of non-alloy black sheet steel, 2,769 tons of plain structural shapes, and 2,120 tons of non-alloy cold rolled strip. Sweden was second with a total of 12,870 tons of which shipments of 5,936 tons of non-alloy plates and 3,705 tons of pig iron made up the larger proportion. Third place went to Japan in whose total of 12,432 tons was included 6,163 tons of non-alloy ingots and 1,205 tons of car axles without wheels. Other leading export markets were Brazil, 11,767 tons; the Netherlands, 11,512 tons, and the Philippine Islands, 10,770 tons. In the 11,767-ton trade with Brazil heavy rails, 2,463 tons; non-alloy black steel sheets, 2,300 tons, and tin plate, 2,095 tons were the chief items. The bulk of the 11,512-ton trade with the Netherlands consisted of 5,711 tons of non-alloy "other" plates and 1,786 tons of non-alloy black steel sheets. The Philippine Islands took 2,284 tons of galvanized steel sheets, 1,526 tons of tin plate and 1,210 tons of plain shapes as part of the 10,770-ton total.

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The Import Trade

IMPORTS of iron and steel products in May totalled 24,171 tons valued at $1,405,883 as compared with April imports of 41,314 tons valued at $2,703,290. Structural shapes ranked first in point of tonnage among classes of products—the 5,008 tons received be-

(*Please turn to Page 434*)

Exports and Imports of Wire

(*Continued from Page 433*)

ing furnished by Belgium, 4,107 tons; France, 882 tons, and Mexico, 19 tons. Ferromanganese ranked second at 4,670 tons with 2,783 tons coming from the Netherlands, and 1,627 tons from Norway. Third in importance was the 3,219 tons of pig iron supplied chiefly by British India, 2,608 tons, but with 511 tons coming from Canada and 100 tons from Sweden.

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BELGIUM with 8,548 tons was the chief source of supply—4,107 tons of structural shapes being the most prominent item followed by 1,654 tons of "other" hoops and bands, and 1,020 tons of solid or hollow bars. The Netherlands was the next in line with 2,783 tons of ferromanganese featuring the 2,800-ton trade. Third place went to British India, whose sole item of trade was 2,608 tons of pig iron. Canada with a total of 2,233 tons made 1,212 tons of spiegeleisen its main item.

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CARD CLOTHING: 23,424 square feet, $35,115 (19,822 square feet, $28,438), all coming from the United Kingdom, 21,429 square feet, $32,135; Belgium 1,475 square feet, $2,356; and Switzerland, 520 Square feet, $624.

✦ ✦ ✦

WIRE Cloth and Screening: 29,451 square feet (52,158 square feet) with 16,527 square feet coming from the Netherlands, 10,312 square feet from Canada, 2,264 square feet from France, and 348 square feet from the United Kingdom.

✦ ✦ ✦

WIRE Fencing and Netting: Galvanized before weaving: None (none). Galvanized after weaving: 704,700 square feet (574,500 square feet) coming entirely from Belgium, 697,500 square feet, and Germany, 7,200 square feet.

FOURDRINIER: 19,583 square feet (33,015 square feet) furnished by Sweden, 14,644 square feet; France, 4,662 square feet, and Germany, 277 square feet.

✦ ✦ ✦

WIRE Heddles: 367,000 pieces (1,728,000 pieces). 257,000 pieces came from Belgium and 110,000 pieces came from France.

✦ ✦ ✦

Scientific Control of Bessemer Steel Making

THE electric cell replaces the human eye in the first basic improvement claimed in eighty years of Bessemer steel making.

✦ ✦ ✦

JONES and Laughlin Steel Corporation have announced the development of the "Bessemer flame control" through use of photoelectric cells to regulate converters making molten pig iron into steel.

MICROMETER PRECISION MICRO-WELD TRADE MARK REG. U. S. PAT. OFF.

CONTINUOUS IMPROVEMENT

MICRO-WELDERS with dial indicating annealing attachments are now available for high carbon wire.

There is positive control of annealing temperature and already hundreds of these special MICRO-WELDERS are proving their dependability and satisfactory performance with leading manufacturers.

Model E.-1-S Welder Capacity .010 to .062" high & low carbon wire.

MICRO PRODUCTS COMPANY

20 NORTH WACKER DRIVE, CHICAGO, ILL.

Telephone, State 7468

SINCE discovery of the Bessemer manufacturing process around 1850, skilled eyes of workmen have determined by watching the flame when the impurities had been blown out of the hot metal to insure uniform quality steel.

✦ ✦ ✦

FOR the last several years open hearth furnaces using pig or scrap iron have been the mainstay of the steel industry, outnumbering Bessemers more than ten to one. Experts say steel from an open hearth can be guaged more accurately by employing certain mechanical devices not applicable to Bessemers.

✦ ✦ ✦

PRODUCERS long have endeavored to put Bessemer converters back into greater use for multiple reasons, mainly because they can manufacture a uniform steel with greater machinability and assure a wider market. The Bessemer produces steel in fifteen minutes while the open hearth requires twelve to fourteen hours.

✦ ✦ ✦

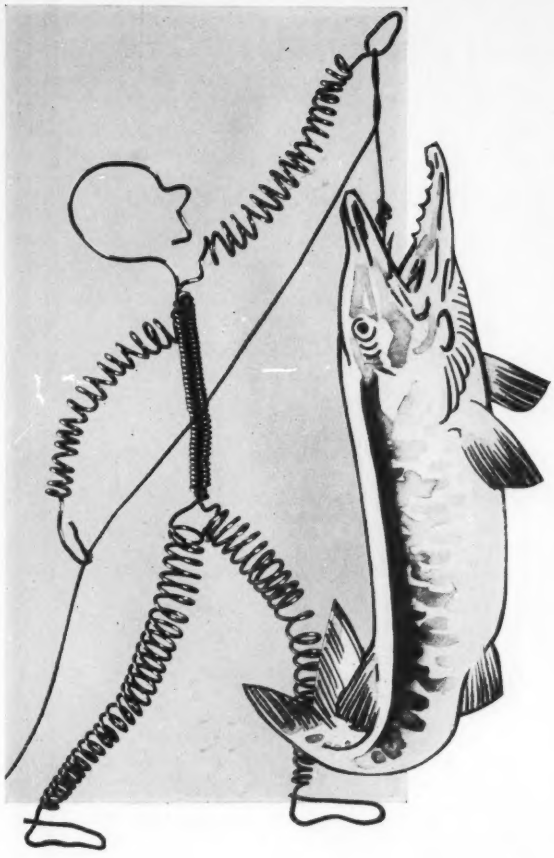
JONES and Laughlin researchers developed the new flame control which they said operates with split-second speed and without the variables of the human eye, giving the industry for the first time scientific quality controls.

✦ ✦ ✦

Hair Springs

THE most expensive form in which iron is used is that of hair springs. The value of a ton of springs is more than 3,000,000 times that of a ton of iron ore. The value of watch springs costing $16,000,000 a ton made of steel would be only $17,500,000 a ton if made of gold. An exhibit in the British Pavilion will show graphically the rise in value of iron from crude ore to steel spring.

For Information
Regarding
The Wire Association
Address
Richard E. Brown, Secretary
Stamford Trust Co. Bldg.
300 Main St., Stamford, Conn.



After the BIG Ones!

Small fry are fine and dandy — and Keystone welcomes the little orders. But — who doesn't like to land the BIG ones? The Keystone Steel and Wire Company is admirably equipped to handle wire orders of any size and kind. We're the largest independent steel and wire mill in the country — with production to meet any demand, and a metallurgical staff proud of its reputation for solving tough problems. At the same time we're compact enough to move fast and give unusual service. If you have a wire order swimming about — give us a chance to land it!

KEYSTONE

STEEL & WIRE CO., Dept. W, PEORIA, ILL.

HIGH CARBON
or
LOW CARBON

SAMSON
REG. U.S. PAT. OFF.
SPRING WIRE
KEYSTONE STEEL & WIRE CO. PEORIA, ILL.

Bright . . . Tinned
Coppered
Annealed
Galvanized

» As Distinctive

as a salt sea breeze,

a Cape Cod scene

a mountain stream

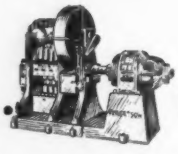
is the Performance of the

Robertson Cable

Lead Encasing Press . . .

the Robertson Hydro-

Pneumatic Accumulator

. . .  the Robertson

Hydraulic Pump.

Get details Write—

JOHN ROBERTSON CO., INC., 125-137 WATER ST., BROOKLYN, N. Y.

Plans for the 1939 Convention

(*Continued from Page 431*)

Steel Company is chairman of the committee again this year, and promises that no fault will be found with the show he produces this year.

+ + +

American Society for Metals Dinner

THE Annual Dinner for the American Society for Metals —generally referred to as the "Steel Treaters Dinner"—will be held at the Palmer House, Thursday evening, October 26th, and members of the Wire Association are invited to participate. The price of tickets will be announced later and full information can be obtained at the Wire Association information desk in the Hotel Congress during the week of the Convention. Last year there were about twenty members of the Wire Association who attended individually and this year it is hoped to get a sufficient number together to arrange for a group of tables.

+ + +

Booth at Show

THROUGH the courtesy of the American Society for Metals, the Wire Association will have a booth at the Show in the International Ampitheater. Members of the Association are invited to make this booth their headquarters while visiting the Exposition.

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A Review of Recent Wire Patents

No. 2,161,165, WIRE SPRING STRUCTURE, Patented June 6, 1939 by Jerome Clifton Hirschman, Indianapolis, Ind.

The wire, making up this helical spring, has a flat upper surface, whereby, it is claimed, the spring will resist side bending to a greater degree than will a round or wholly flat wire, yet will permit vertical resiliency.

✦ ✦ ✦

No. 2,161,271, BOLT, Patented June 6, 1939 by Harold A. Anderson, Los Angeles, Calif.

In this patent, the invention lies in the shape of the head and the unthreaded area immediately next to the head, with both portions squared.

✦ ✦ ✦

No. 2,161,611, FASTENER, Patented June 6, 1939 by Axel V. Boggild, Trumbull, Conn., assignor to General Electric Company, a corporation of New York.

A self-tapping screw is provided, particularly adapted for securing metal parts to members of insulation material and the like.

✦ ✦ ✦

No. 2,162,130, WIRE ROPE OR CABLE, Patented June 13, 1939 by William E. Somerville, Coal City, Ill.

This wire rope embodies a stranded wire body, the periphery of the body comprising a plurality of separate wires

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.

contacting each other, certain of the wires being formed of softer material than certain other of the wires, whereby the harder wires will be seated or imbedded in the softer wires.

✦ ✦ ✦

No. 2,162,177, COATING FOR FASTENINGS, Patented June 13, 1939 by Ernest W. D. Laufer, Arlington Heights, and Clarence P. Reis, Chicago, Ill., assignors to The American Steel and Wire Company of New Jersey, a corporation of N. J.

A wire nail is provided having a coating consisting of a resinous material having a pyroxylin base dissolved in a solvent, the coating adapted to adhere to the surface of the nail to increase the coefficient of friction between the nail and wood.

✦ ✦ ✦

No. 2,162,357, DRAWING OF WIRE, Patented June 13, 1939 by Robert C. Pierce, Niles, Mich., assignor to National Standard Company, Niles, Mich., a corporation of Michigan.

An object is to arrange the machine so that the wire is drawn vertically downward through the dies, thereby facilitating the lubrication of the dies and the handling of the wire. There are 20 claims and 21 drawings in this patent.

✦ ✦ ✦

No. 2,162,498, MACHINE FOR AND METHOD OF WINDING HEADLIGHT COILS, Patented June 13, 1939 by Raymond H. Beebe, Bridgeport, Conn., assignor, by mesne assignments, to Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania.

The assembly includes a number of coil winding mandrels, device for winding a coil of wire on one mandrel, device for terminating the winding operation, device for changing the relative position of the coil-winding device and the coil-winding mandrel to produce a straight portion of wire, and device for actuating the coil winding device to wind another coil of the wire on another mandrel prior to severing the first coil from the supply wire.

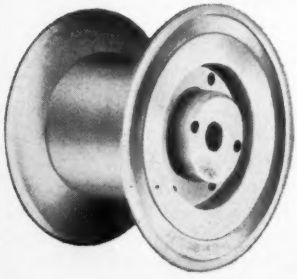
✦ ✦ ✦

No. 2,162,953, INSULATED ELECTRICAL CONDUCTOR, Patented June 20, 1939 by Robert B. Lattin, Cheshire, Conn., assignor to Rockbestos Products Corporation, a corporation of Mass.

Surrounding the wire conductor is a layer of asbestos, impregnated with a mixture of a resinous phenolic condensation product and a chlorinated diphenyl, the impregnated asbestos being flexible, however.

(Please turn to Page 438)

FINE WIRE HIGH SPEED WIRE DRAWING SPOOLS



James Day (Machinery) Ltd.,
Sentinel House,
Southampton Row,
London, W. C. I, England.

MOSSBERG **PRESSED STEEL** CORP.

Announces a complete line of HEAVY DUTY PRECISION SPOOLS and REELS especially designed for high speed wire drawing and annealing.

The degree of efficiency obtained by the HIGH SPEED WIRE DRAWING MACHINE is largely dependent upon the accuracy and durability of the take-up spool.

The use of our PRECISION SPOOLS will increase your machine efficiency and eliminate your spool difficulties.

Complete range of sizes.

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18 West Street,
ATTLEBORO, MASSACHUSETTS, U. S. A.

COMBINATION
500 lb. CAPACITY WIRE DRAWING — ANNEALING — STRANDING — REEL.

A Review of Recent Wire Patents

(Continued from Page 437)

No. 2,163,019, WIRE COILING MACHINE, Patented June 20, 1939 by William H. Blount, Worcester, and Clayton F. Fisher, Spencer, Mass., assignors to Sleeper & Hartley, Incorporated, Worcester, Mass., a corporation of Mass.

For coiling wire into a helix of variable pitch, length and diameter, a machine is provided in which the coiling arbor is held stationary, both axially and rotatively for a considerable time after the coil has been made, so that there is time for a desired wire-fashioning operation. Twenty-four claims in the patent.

No. 2,163,119, MAGNET WIRE, Patented June 2, 1939 by Orville F. Freeland, North Muskegon, Mich., assignor to Anaconda Wire & Cable Company, New York, N. Y., a corporation of Delaware.

A magnet wire is provided, reinforced with a high-strength, non-conducting strand.

✦ ✦ ✦

No. 2,163,235, ELECTRIC CABLE, Patented June 20, 1939 by Clyde L. Chatham, Nutley, N. J.

In this cable, the neutral wires are covered and protected by a braided covering.

✦ ✦ ✦

No. 2,163,389, WIRE MILL EQUIPMENT, Patented June 20, 1939 by Lafe Young and Alfred A. Boyle, Alton, Ill., assignor to Laclede Steel Company, St. Louis, Mo., a corporation of Mo.

The invention lies in the provision of a stripper reel of considerable height and strength to accommodate a relatively large quantity of wire.

✦ ✦ ✦

No. 2,163,565, APPARATUS FOR FILAMENT COILING, Patented June 20, 1939 by Ralph B. Thomas, Beverly, Mass., assignor to Hygrade Sylvania Corporation, Salem, Mass., a corporation of Mass.

This apparatus is especially adapted for coiling tungsten wire for lamp filaments. A current of heated air flows over the wire, being coiled, near the point of coiling.

✦ ✦ ✦

Reissue No. 21,130, WIRE FABRIC MAKING MACHINE, Patented June 27, 1939 by Israel C. Gellman, Rock Island, Ill., assignor to Northwestern Steel and Wire Company, a corporation of Illinois.

A machine is provided for making wire mesh fabric and this is a reissue of patent 1,905,086 dated April 25, 1933.

✦ ✦ ✦

No. 2,163,669, MACHINE FOR STRAIGHTENING AND POLISHING RODS AND TUBES, Patented June 27, 1939 by Carl Didden, St. Louis, Mo.

The machine is adapted to both straighten and polish rods etc.. at the same time, while passing through the straightening means.

✦ ✦ ✦

No. 2, 164,043, WIRE NETTING MACHINE, Patented June 27, 1939 by Theodor Rossler, Neustadt (Orla) Germany.

The machine comprises a pair of shuttle members, rotatable mounting means for the shuttle members, and stationary means engageable with the shuttle members to effect reciprocation of the shuttle members coactive with the rotation thereof.

✦ ✦ ✦

No. 2,164,168, ARMORED ELECTRICAL CABLE, Patented June 27, 1939 by Joseph Wertzheiser, Newark, N. J., and Harry Charmoy, Long Island City, N. Y., assignors to Hillside Cable Co., Hillside, N. J., a corporation of N. J.

Wound about the wire conductors are strips of paraffin paper, overlapping each other at turns, the wax welding the turns together. About this paraffin paper, is a second winding of paper free of wax.

Syncro has the answer . . . . to your problem!

• You face the problem of producing quality wire at the lowest possible cost so as to enable you to return a profit on the investment represented by your plant and equipment.

• And Syncro can help you solve this problem. For the entire line of Syncro machines are superbly designed and constructed — to insure the quality of your product and to keep your production costs at the minimum.

• Whether you are interested in wire drawing machinery, insulating machinery for applying all materials (including cellulose acetate, paper, silk and cellophane), taping heads, capstans, annealing and tinning units or allied machinery, we believe that the modern Syncro line will give you the most for your money.

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Manufacturers of materials, tools and equipment for wire drawing and forming plants are constantly making improvements and additions to their lines. If you do not find the product or service in which you are interested, additional information will be supplied promptly. Simply address:

WIRE & WIRE PRODUCTS

300 Main St., Stamford, Conn.

'Round the World With the Wire Industry

German Notes

CONTRARY to the usual low demand at this time of the season the demand for wire and wire products from almost all markets of the world this year continues most satisfactory. The Eastern markets are buying and the Near East is the largest buyer, together with the Latin American markets and the Baltic States which are buying very briskly. Shipping dates have been extended and prices are firm, as no concessions were to be obtained, although price advances were moderate. It is estimated that the improved demand will be maintained in July and will not go down before the end of the month. The domestic demand also continues very heavy and it is expected this demand will continue. Nails and netting have been extensively bought. The domestic prices will be left unchanged for the balance of this year.

✦ ✦ ✦

THE cartellization of the German wire industry has been the subject of new regulations, laid down in a new draft bill which concerns the wire (plain, fencing and other commercial wire), wire nails and spring wire production. The makers of these products are obliged to unite in a cartel. The cartel had already been existing in Germany for ten years but there was still a small number of outsiders, representing about 2% of the capacity, which were cutting prices. These outsiders are now forced to join in the cartels. Other products such as (barbed wire, netting, mesh, ropes, etc.) are not concerned, as there is no outside competition. The industry has also been compelled to stop construction of new works, or to expand present production in the aforesaid products for the period of one year. The expansion in special steel wire and other wire products is not included. The Austrian and Sudeten works are also included.

✦ ✦ ✦

PRICES for wire rods have increased, in cooperation with the IWECO. The advance has been, according to the markets—between sh 3 and 5 per ton for all wire products, for wire nails in the average sh 4 per ton for galvanized wire dh 5 and for barbed wire up to sh 6 for certain markets. Wire rods were also advanced about sh 5 per ton, except for certain markets such as Scandinavia and Mexico which have to pay only sh 3 per ton more. The market is very firm and the demand continues satisfactorily.

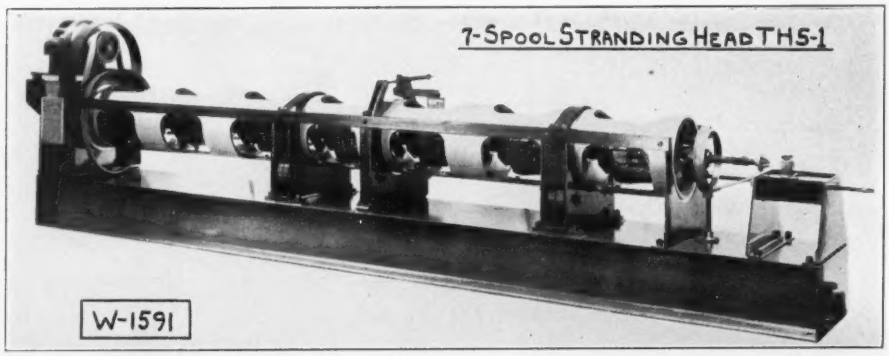
(*Please turn to Page 440*)

THE WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.

TUBULAR STRANDING MACHINES
Standard Sizes For From 5 to 1000 Pound Spools
Silent Support Rolls—All Steel Rotor—Vee Belt Drive—Electric Stops
7 Second Brakes



ELECTRICAL WIRE, CABLE & WIRE ROPE MACHINERY
Printed Literature Available On Considerable Of The Equipment Used In These Fields—Inquiries Are Invited

'Round the World With the Wire Industry

(*Continued from Page 439*)

WIRE exports in April were 17.556 tons as compared with 16.769 tons in the month before and 13.128 tons in February 1939. May will show another substantial advance. The average value of exports per ton gained 3.4% in April.

✦ ✦ ✦

THE export demand for sewing and other needles is poor at present. Prices are still receding and Japanese competition in this product is rather keen. China to a great extent is lost as a customer, but European markets are buying more.

✦ ✦ ✦

GERMAN production of wire rods in the first quarter of this year was 358.460 tons an advance of about 54.000 t over last year. A further rise is anticipated for the second quarter.

THE Austrian and Czech works, also the Hungarian industry (one factory) and the Yugoslavian (also one factory) have become members now of the German wire mesh Cartel. There is no export wire mesh industry in Belgium-Luxenbourg, Poland and Switzerland, nor have the Italian, the Swedish or French industries any sizable export business in wire mesh. Only Holland has a powerful export capacity. Negotiations are therefore pending with Holland, the result of which it is too early to say whether it will be the formation of a continental wire mesh Cartel.

✦ ✦ ✦

THE German demand for nonferrous metal wires, contrary to the demand for iron and steel wires, has not yet improved. It has been particularly slack in overseas markets, whereas more brass wire has been bought in Europe. The demand for aluminum wires is quite satisfactory, but as a whole the outlook for a thorough improvement is not too promising. Competition is still very keen.

✦ ✦ ✦

Firth Sterling Steel Acquires American Carbide Alloys Corp.

THE **Firth-Sterling Steel Company** of McKeesport, Pa., recently acquired the **American Carbide Alloys Corporation,** with equipment and stocks of finished and raw materials at Lewiston, Me., and Detroit, Mich., together with exclusive American rights for the manufacture of **"Cutanit,"** a cemented titanium carbide alloy.

✦ ✦ ✦

"CUTANIT" is a steel cutting cemented carbide invented by **Dr. Paul Schwarzkoph,** noted European metallurgist, who is the sole owner of the basic patents in the titanium carbide field. Development of this cutting material in Europe has aided the manufacture of big guns, rifles, shells and other war materials and its use has grown from 9,900 pounds in 1935 to 44,000 pounds in 1937. It is now

TIME TO SPEAK---
WITH
RESERVATIONS!

WIRE ASSOCIATION
CONVENTION

CHICAGO OCTOBER 23-26

HEADQUARTERS
CONGRESS HOTEL
950 ROOMS from $3.00 John Burke, Mgr.
National Hotel Management Co., Inc. Ralph Hitz, Pres.

being used in United States arsenals for the machining of shell steel.

✦ ✦ ✦

THE **Firth-Sterling Steel Company** is well known as a maker of high speed tool steels and in the production of tungsten carbide cutting tools. According to **L. Gerald Firth,** president of the company, the primary value of **"Cutanit"** is that present cemented tungsten carbide materials are given greatly increased efficiency for steel cutting by a percentage of titanium carbide, thus forming a double carbide of tungsten and titanium. This double carbide is the basis of the **"Cutanit"** patents which have caused such a tremendous development in the use of cemented carbides for steel cutting in Europe.

✦ ✦ ✦

ONE pound of tungsten made up in carbide form for use as tool tips is equivalent to the use of many times that amount of tungsten in the form of high speed tool steel, Mr. Firth explained. Thus, a comparatively small amount of tungsten in carbide form, particularly in combination with titanium carbide can displace large quantities of high speed steel.

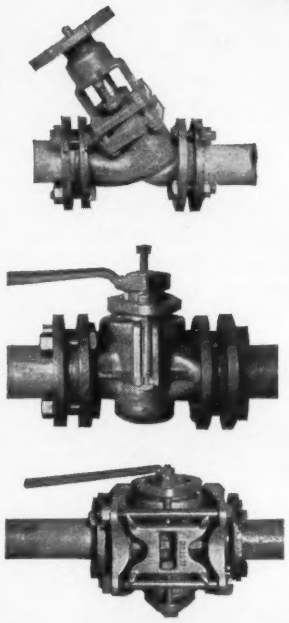
✦ ✦ ✦

THE principal source of tungsten is China, and this country, under normal peace time conditions produces less than half of its total requirements. Under war conditions, production would fall far short of our needs. To these problems, Mr. Firth believes, the recently developed product **"Cutanit"** appears to provide in a large degree, the solution.

✦ ✦ ✦

THE mineral employed in the manufacture of **"Cutanit"** is titanium, which is found plentifully in the United States, and its development will release a large portion of the tungsten now used in high speed tool steel for other uses where tungsten is indispensable.

VALVES for any acid service



THE Y VALVE

Acid resisting . . . for places where valve is seldom turned . . . rising stem . . . outside screw and yoke . . . full opening . . . can't stick or score . . . all parts mechanically aligned . . . split flanges for Duriron pipe; companion flanges for lead or screwed pipe.

THE DURIRON-NORDSTROM VALVE

Acid resisting . . . plug valve with lubricant ducts . . . plug releases by hydraulic pressure . . . seating surface lubricated . . . lubricating ports prevented from contacting solution handled . . . useful with acids having no lubricating properties.

THE "P. R." VALVE

Acid resisting plug valve with mechanical plug-releasing feature . . . valuable for handling acid sludges and solutions containing abrasives . . . and where lubricated valve is not permissible.

Send for Bulletin No. 601 for details

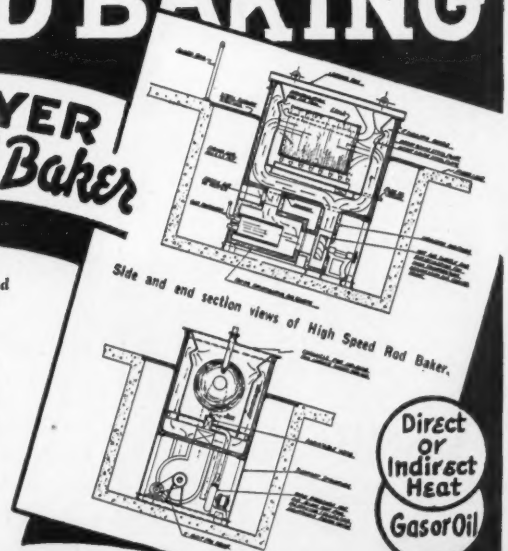
THE DURIRON CO., Inc.

445 N. Findlay St. Dayton, Ohio

It will "show you something" in **ROD BAKING**

CARL-MAYER "Hi-Speed" Rod Baker

Patents Allowed and Patents Pending



Side and end section views of High Speed Rod Baker.

It is backed by 20 years' experience and a reputation for advanced engineering and dependability in industrial oven construction . . . Write for literature today.

Direct or Indirect Heat

Gas or Oil

THE CARL-MAYER CORP.

ROD BAKERS ~ OVENS ~ AIR DRAW FURNACES

3030 EUCLID AVENUE ◇ CLEVELAND, OHIO

TRY SMIT SUPERIOR DIAMOND POWDER

✦ ✦ ✦

FINEST Raw Material reduced to sharp cutting fragments under controlled conditions.

✦ ✦ ✦

UNIFORM Sizes from #1 to #6 assured by our particle size analyzer.

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DEPENDABLE Performance is the result of using the consistently uniform Smit Diamond Powder.

✦ ✦ ✦

J.K.SMIT&SONS, Inc.

157 Chambers Street, N. Y., N. Y.
968 Farmington Avenue
Hartford, Conn.
605 Law & Finance Building
Pittsburgh, Pa.

New Carboloy Bulletin Specifies Grades, Speeds and Power Requirements

AS the result of an engineering survey of several years' duration, Carboloy Company, Inc., Detroit, have issued an engineering bulletin giving detailed recommendations for proper grade selection, suggested speeds and feeds, and a method for determining power requirements.

✦ ✦ ✦

THE bulletin groups the materials to be machined into three main classifications, i.e., steel, ferrous castings, and nonferrous and non-metallic materials. A full-page chart of recommendations is devoted to each of these classifications with specific recommendations given for a wide range of metals within each classification. For example, in the chart on steel, S.A.E. steels are listed in 10 classifications with specific recommendations for each. Recommendations cover the suggested grade to use, minimum and maximum speeds, a suggested safe starting speed, and a power constant to be used in determining horse power requirements in each case.

✦ ✦ ✦

THIS bulletin contains certain features that should be of particular interest to the practical shopman. It avoids the common method of listing recommendations so broad that errors in selection are probable. For example, in the matter of grade selection, a definite grade is specified in each case that has a wide margin of safety, —one that can be used with good results under average conditions. The bulletin also is specific in regard to proper speeds to use. In each case a definite, safe starting speed is listed and accompanying this specific recommendation is the suggested minimum and maximum speeds to which adjustments can be made after starting the job.

✦ ✦ ✦

COPIES of this bulletin (Bulletin GT-114) may be obtained from Carboloy Company, Inc., 11171 E. 8 Mile Road, Detroit, Michigan.

Hot Coating Steel Wire With Aluminum

(*Continued from Page 425*)

cal analysis does not give clear indications. Metallographic research will ultimately settle the matter, and, in the opinion of the author, in favor of the existence of a definite iron-aluminum compound.

✦ ✦ ✦

ACCORDING to **Ross,** the fact that the bond grows stronger upon heating for some time at 1800° F., is proof that it is not of definite composition. If he meant that AL_3FE is brittle and that on the contrary the bond is malleable, he is disproving his point, because the solid solutions of iron in aluminum are not particularly malleable. As the iron rises the aluminum becomes increasingly brittle, and at 12% iron it is barely workable in rolls. Under the coating process described, the author can picture nothing but the formation of AL_3FE embedded in a matrix of soft aluminum. This compound always results from the alloying of the two metals, in all iron contents from zero to 48%, and it is hard to see why there should be an exception here. Since inherently brittle compound is embedded in a soft matrix the net result would be a more malleable bond than would be afforded by a solid solution.

✦ ✦ ✦

THE process is carried out as follows:

The wire runs off free reels and through an electrolytic pickling bath, followed by an ordinary pickle and rinse. Muriatic acid is generally used, at 20/25% strength, and heated by steam to about 160°F. This heating must be constant, since unlike in galvanizing, the wire does not come to the pickle bath from an annealing operation and bring stored heat with it. Rinsing and drying are done in various baths, according to conditions. In the rinse the bath is usually of running water, flowing against the movement of the wire. If continuous wasting of the acidified wash water is impossible

(*Please turn to Page 443*)

RODINE

CONTROLS THE PICKLING BATH

Just a little RODINE in the pickling bath saves metal, saves acid, saves fuel, prevents embrittlement, keeps down acid spray, and gives better pickling—at less cost. Write for Bulletin 13-L.

If you have any metal-treating problem—pickling, cleaning, rust-proofing under paint—we will gladly work with you to solve it.

American Chemical Paint Co.

Box 306, AMBLER, PENNA.

Detroit, Mich. Walkerville, Ont.

This is an invitation for you to become a member of The Wire Association. ✦ ✦ ✦ ✦ ✦ ✦

The Annual Dues Are $10.00

AND INCLUDE

1. A subscription for the period of the membership to the designated official publication of the Association, "WIRE AND WIRE PRODUCTS."
2. A copy of the annual WIRE BUYERS GUIDE AND YEAR BOOK OF THE WIRE ASSOCIATION.
3. A copy of the proceedings and discussions held at the annual meeting.
4. Co-operative and helpful information on processes and methods of production.

For Details Address

Richard E. Brown, Secretary,

The Wire Association

Stamford Trust Co. Bldg.

300 Main St., Stamford, Conn.

(because of statute or city ordinance) and there is no recovery process, the rinse tank can be kept alkaline with ammonia, and eventually evaporated to secure ammonium chloride as a flux for galvanizing.

✦ ✦ ✦

DRYING can be done by the use of a tank of boiling water, and a cleaner job done, or, since the adjacent hydrogen furnace is at 1800°, a baking can be done with waste heat, at about 800° to 900°, which will not only dry the wire but drive off any traces of acid or ammonium chloride.

✦ ✦ ✦

THE wire then goes to the hydrogen chamber, then through the aluminum kettle, through the wipers, (if any) and to the take-up blocks. If particular physical properties are required, treatments after the coating process are relied upon. As stripped from the blocks the wire is "medium soft." If high tensile is wanted, with bending only over a reasonable radius, the wire may be drafted after coating, to the required hardness. Carbide dies are naturally the best for such service; they give a well polished surface, excellent for electric welding, or any other fabricating process.

✦ ✦ ✦

THE author has had good success with the chemical processes for aluminum coating, especially the MBV process, but it is quite possible to arrange equipment to plate either by this or by the Eloxal process. In these processes, however, the period of immersion must be relatively long, (five minutes for the MBV) so the output per strand is not high. The necessary salts had best be purchased from the equipment dealer, because the value of the coating is very dependent on the exactness of the content of the bath in chromates and soda, and its careful maintenance. Full instructions are given at the time of purchase. Bath temperature is about 190° to 210° F., and the heating is best done with coils. Superheated steam

(*Please turn to Page 448*)

STEEL REELS AND DRUMS

for

WIRE AND CABLE INDUSTRY

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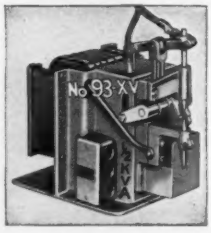

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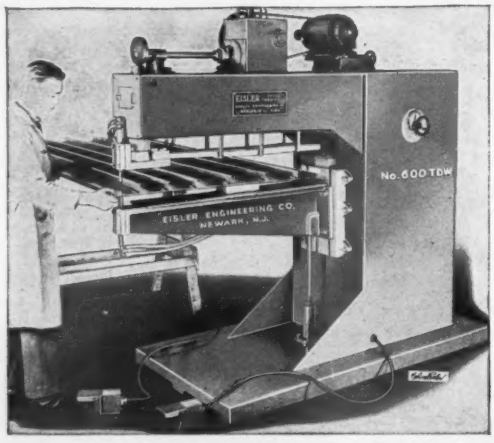

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Wm. Glader Machine Works

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Automatic Strand Dipping for Wire Rope Manufacture

(*Continued from Page 416*)

Heat Required by the Compound

APPROXIMATELY five pounds per hour maximum consumption (varying according to the size of the strand) to be heated from 150 degrees to 270 degrees F. Since the compound was premelted in order to facilitate transferring from the barrels to the dipping tank, 120 degree rise in heat per pound was needed. The specific heat of the compound being approximately .3 we have—

5 lbs. x 120 Btu x .3 .....180 Btu

✦ ✦ ✦

Heat Absorbed by the Strand

ASSUMING a temperature rise of 100 degree F. in the strand as a result of being immersed in the hot compound, and with approximately 640 pounds of strand going through the tank per hour, it was only necessary to apply the specific heat factor of steel to obtain the following simple multiplication:

100° x 640 lbs. x .125 ..... 8000 Btu

Total Btu required 16430

✦ ✦ ✦

SINCE 3415 Btu equals one KWH, it was apparent that approximately 5 KW would supply the ample heat input.

✦ ✦ ✦

THE screw-in type of G. E. Calrod Immersion heater was selected because it permitted a comparatively simple installation. Two threaded collar flanges were welded on the outside of the tank into which the units were screwed. One was placed on each side of the dipping sheave to give even heat distribution. By dividing the heat input into two units of 2.5 KW each, a much lower watt density of exposed surface of heater was obtained. This spreads the heat liberated from the immersion unit over a surface sufficiently large to prevent carbonization and possible damage to the compound or the heater. The unit selected is listed in the General Electric Company's Industrial Heating Handbook under Cat. No. 15X839.

THE selection of automatic control equipment was made by reference to extensive data on the subject in the same handbook. Thermostat CR 2992, being a standard control instrument designed for use with small electric heating units, required only a determination of the desired temperature range, with reference to the minimum and maximum setting. Thermostat CR 2992 R-1 Cat. No. 4980281G120 provides a temperature range from 220 to 270 degrees Fahrenheit. While the thermostat could normally carry the load because of its high capacity, controlling the load through G. E. magnetic switch CR 2811 Cat. No. 4986311A4 added a measure of strength and ruggedness—an important factor because of the vibration in a wire rope plant. The additional cost of the magnetic switch was warranted because it not only minimized wear and tear on the thermostat, it made the operation of the pot doubly foolproof.

✦ ✦ ✦

SUCH is the experience of the **Edwards Wire Rope Company of San Francisco.** Twelve months have elapsed since the first electrically heated tank was installed and it has operated so successfully that five more have been built. From every standpoint the installation has proved satisfactory. No more do the men look upon the handling of tar as a necessary evil. Gone are the old hazards. Annoying products of combustion no longer plague the operators. Wire rope compound is now applied with precision. The lubrication is superior because automatic temperature control guarantees uniform and wasteless application.

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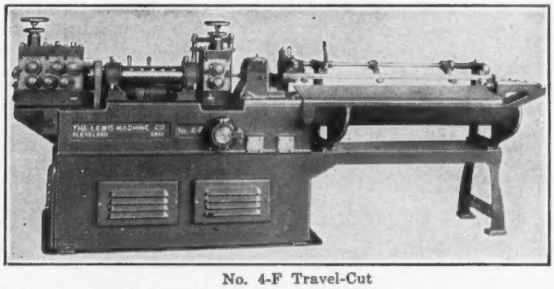

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WIRE and WIRE PRODUCTS
STAMFORD TRUST CO. BLDG., STAMFORD, CONN.

Continuous Lead Extrusion Equipment

(*Continued from Page 423*)

Equipment, the operation of such plant being carried out almost entirely from the control pedestal and the attendant need rarely leave this central point. The only other attention required is to keep the magazine charged with lead billets. This would only be a necessary operation about once or twice an hour.

✦ ✦ ✦

A NUMBER of Henley Continuous Lead Extrusion Machines are now in commercial operation in England and on the Continent. Some of these machines have been in continuous use for as long as two years, sheathing rubber insulated, paper insulated and telephone cables with pure lead and various alloys, including 2% tin and 1% antimony. The machines are also used commercially with success for the manufacture of lead water piping.

✦ ✦ ✦

IN conclusion the writer would like to express his appreciation and thanks to Messrs Pirelli-General Cable Co., Ltd., of Southampton and to Messrs. Henley Extrusion Machine Co., Ltd., of Slough, for their kindness and assistance in supplying data and information used in connection with the preparation of this Paper.

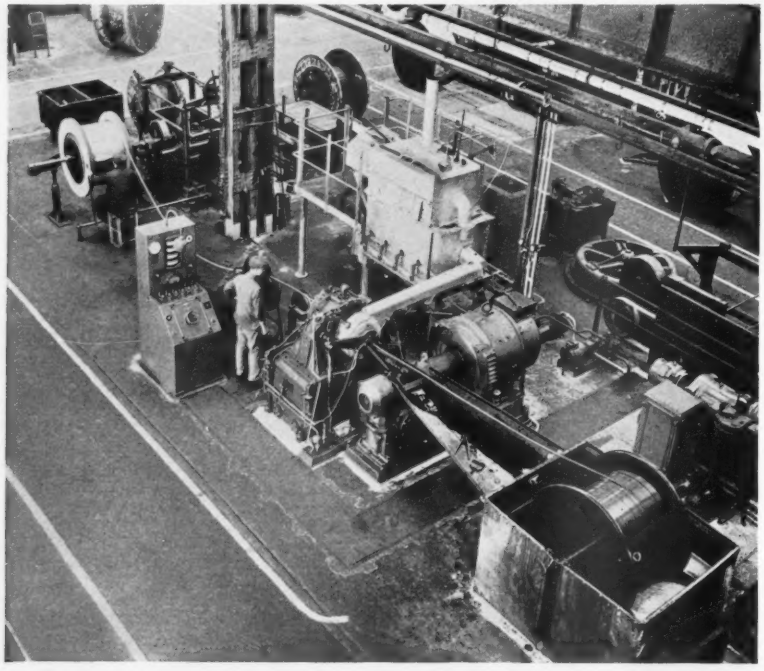

Fig. 9. Complete Lay-Out of the Continuous Lead Extrusion Equipment.

✦ ✦ ✦

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Sodium Silicate Used To Protect Cables

A REPORT published by the Research Station of the British Post Office makes reference to research on the prevention of corrosion of underground cables. The modern telephone system is so extensive that overhead wires have given place to underground cables in large cities. The complexity of the system beneath London can well be imagined, but the acid subsoil of that city causes corrosion and costly replacements.

✦ ✦ ✦

THE cables are now coated, before laying, with sodium silicate, a chemical much used to prevent corrosion of lead water pipes. This forms a protective film on them which tests have shown to be unaffected after 8 years' burial in the most acid soils.

✦ ✦ ✦

IN rolling copper bars into rods the bars are passed through a series of graded grooves. The grooves become successively smaller and are alternately square and oval. This results in a kneading action by which the crystalline structure of the cast bar is broken up into a uniform fine-grained structure in the rods. Thus the rods become stronger than the bars. This is graphically explained in the Copper and Brass Industry Exhibit at the New York World's Fair.

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EYELETS
ZINC WIRE
ZINC STRIP
THE PLATT BROS. & CO.
WATERBURY, CONN.

Hot Coating Steel Wire With Aluminum

(*Continued from Page 443*)

from open pipes works effectively, but slowly dilutes the bath.

✦ ✦ ✦

THE ELOXAL process gives a coating which is the most lasting and soundest for many purposes, but suffers the disadvantage that it requires very skillful management, and should be undertaken only by experts.

✦ ✦ ✦

Farrel-Birmingham Personnel Changes

FARREL-BIRMINGHAM COMPANY, INC., Ansonia, Conn., announces the following personnel changes:

✦ ✦ ✦

GEORGE SCHAEFER, formerly rolling mill design engineer, has been appointed manager of the rolling mill machinery sales division to succeed Norman Shaw.

✦ ✦ ✦

MR. SHAW has been appointed manager of the company's Chicago office, located at 1059 First National Bank Building, Chicago.

✦ ✦ ✦

HE will succeed **Harry Temporal** who is being transferred to the Buffalo division.

✦ ✦ ✦

EDWARD S. COE, who has also been connected with the Chicago office, is being transferred to the rolling mill machinery sales division in Ansonia.

The Annual Convention of The Wire Association will be held at Chicago, Ill., October 23-27, 1939.

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John Robertson Co., Brooklyn, N. Y.

FURNACES—Non-Oxidizing
Electric Furnace Co., Salem, O.

FURNACES—Normalizing
Electric Furnace Co., Salem, O.

FURNACES—Salt Bath
Electric Furnace Co., Salem, O.

FURNACES—Wire, Strip & Sheet
Electric Furnace Co., Salem, O.

GRINDERS—Roll
Norton Co., Worcester, Mass.

INHIBITORS—
American Chemical Paint Co., Ambler, Pa.

INSULATION — Cable or Cable Filler
E. W. Twitchell, Inc., Phila., Pa.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

LEAD—Pig
St. Joseph Lead Co., Josephtown, Beaver County, Pa.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Magnus Chemical Co., Garwood, N. J.
Vanco, Co., The, Manchester, Conn.

LUBRICANTS—Wire Drawing
Magnus Chemical Co., Garwood, N. J.
Vanco, Co., The, Manchester, Conn.

MACHINERY — Armoring (Cable, Wire Hose)
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
John Robertson Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Brazing
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Bunching
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Thompson-Gibb Electric Welding Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

MACHINERY—Coil Winding

Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Coilers

Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
New England Butt Co., Providence, R. I.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling

H. J. Ruesch Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Covering Wire

Fidelity Machine Co., Philadelphia, Pa.
Sinfra Corp., The, Jersey City, N. J.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Cutting

Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
Lewis Machine Co., The, Cleveland, O.
National Machinery Exchange (Used), New York, N. Y.
F. B. Shuster Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Die Making

Firth-Sterling Steel Co., McKeesport, Pa.

MACHINERY—Enameling

American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine, Rahway, N. J.

MACHINERY—Extruding

John Robertson Co., Brooklyn, N. Y.
Royle, John & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire

Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Forming

National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Galvanizing Wire

Broden Construction Co., Cleveland, O.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders

Fidelity Machine Co., Philadelphia, Pa.
H. J. Ruesch Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding

Norton Co., Worcester, Mass.

MACHINERY—Insulating

American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sinfra Corp., The, Jersey City, N. J.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting

Fidelity Machine Co., Philadelphia, Pa.
Sinfra Corp., The, Jersey City, N. J.

MACHINERY—Lead Encasing Presses, etc.

John Robertson Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping

John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer

Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Magnet Wire

American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY — Measuring Wire & Cable

Durant Mfg. Co., Milwaukee, Wis.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack

Glader, Wm., Machine Works Co., Chicago, Ill.
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning

American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Pointing

Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Rod Mill

Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Rolling Mill

Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
H. J. Ruesch Machine Co., Newark, N. J.
Syncro Machine, Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Rubber Strip Covering

New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining

Royle, John, & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire

National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Special

American Insulating Mach'y. Co., Phila., Pa.
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling

American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making

National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Staple

Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening

Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
Lewis Machine Co., The, Cleveland, O.
National Machinery Exchange (Used), New York, N. Y.
H. J. Ruesch Machine Co., Newark, N. J.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Stranding

Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel

Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Swaging

National Machinery Exchange (Used), New York, N. Y.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine, Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Taping

American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Testing

Scott, Henry L., Co., Providence, R. I.

MACHINERY—Testing Size of Wire

Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Tinsel Rolling Mills

American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine, Rahway, N. J.

MACHINERY—Trolley Wire

Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill

H. J. Ruesch Machine Co., Newark, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Welding Wire

Eisler Engineering Co., Inc., Newark, N. J.
Micro Products Co., Chicago, Ill.
F. B. Shuster Co., New Haven, Conn.
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Winding

American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing

American Insulating Mach'y. Co., Phila., Pa.
Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
H. J. Ruesch Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

WHERE TO BUY, Continued

MACHINERY—Wire Measuring
Durant Mfg. Co., Milwaukee, Wis.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Tinning
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Wood Screw
National Machinery Exchange (Used), New York, N. Y.

MILLS—Tandem Rolling and Edging
Torrington Mfg. Co., The, Torrington, Conn.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER—Insulating
E. W. Twitchell, Inc., Phila., Pa.

PAPER TESTERS—
Scott, Henry L., Co., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D. C.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.

PIPING AND FITTINGS—Acid Resistant
Duriron Co., Inc., The, Dayton, O.

PLASTIC TESTERS—
Scott, Henry L., Co., Providence, R. I.

POTS—Lead Melting
John Robertson Co., Brooklyn, N. Y.

PRESSES—Hydraulic and Mechanical
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead
John Robertson Co., Brooklyn, N. Y.

PULLERS—Wire
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
John Robertson Co., Brooklyn, N. Y.

RECORDERS—Fault and Reel
Entwistle, James L., Pawtucket, R. I.

REEL AND TENSION STAND—
Fidelity Machine Co., Philadelphia, Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Hayward, R. B. Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Steel
Hayward, R. B. Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Takeoff
Mossberg Pressed Steel Corp., Attleboro, Mass.

REELS AND SPOOLS—Shipping and Shop
Hayward, R. B. Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Vulcanizing and Impregnating
Hayward, R. B. Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Wire Drawing
Hayward, R. B. Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REFRACTORIES—High Temperature
Norton Co., Worcester, Mass.

ROD BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio.

RODS—Wire—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott, Henry L., Co., Providence, R. I.

RUST PROOF COMPOUND—
American Lanolin Co., Lawrence, Mass.

SKIN PROTECTOR—
Magnus Chemical Co., Garwood, N. J.

SOAPS—Industrial and Wire Drawing
Magnus Chemical Co., Garwood, N. J.
Vanco, Co., The, Manchester, Conn.

SPARK TESTING EQUIPMENT—
Entwistle, James L., Pawtucket, R. I.

SPOOLS—Annealing and Wire Drawing
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

SPOOLS—Shipping and Shop
Hayward, R. B. Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

SPOOLS—Steel
Hayward, R. B. Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

STAMPINGS—Steel
Hayward, R. B. Co., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Brass and Non Ferrous
Hudson Wire Co., Ossining, N. Y.

STRIP—Steel
Firth-Sterling Steel Co., McKeesport, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.

STRIP METAL TESTERS—
Scott, Henry L., Co., Providence, R. I.

SWIFTS—Take-off
Mossberg Pressed Steel Corp., Attleboro, Mass.

TAKE-UPS FOR CABLE, HOSE, LEAD PPRESSES AND SHEET RUBBER—
Entwistle, James L., Pawtucket, R. I.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.

TENSILE TESTERS—
Scott, Henry L., Co., Providence, R. I.

TREADS—Safety
Norton Co., Worcester, Mass.

TRUCKS—
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS—
H. J. Ruesch Machine Co., Newark, N. J.

TURKS HEAD—
Standard Machinery Co., Auburn, R. I.

VALVES AND FITTINGS—Acid Proof
Duriron Co., The, Dayton, O.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y. Co., Phila., Pa.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIRE—Cold Heading
Bethlehem Steel Co., Bethlehem, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.

WIRE—Enameled For Coils
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
Bethlehem Steel Co., Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Co., Ossining, N. Y.

WIRE—Non Ferrous to Specification For Special Purposes
Hudson Wire Co., Ossining, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Stainless Steel—
Firth-Sterling Steel Co., McKeesport, Pa.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.

WIRE AND STRIP—Zinc
Metal Industry Works, Poland.
Platt Bros. & Co., The, Waterbury, Conn.

WIRE TESTERS—
Scott, Henry L., Co., Providence, R. I.

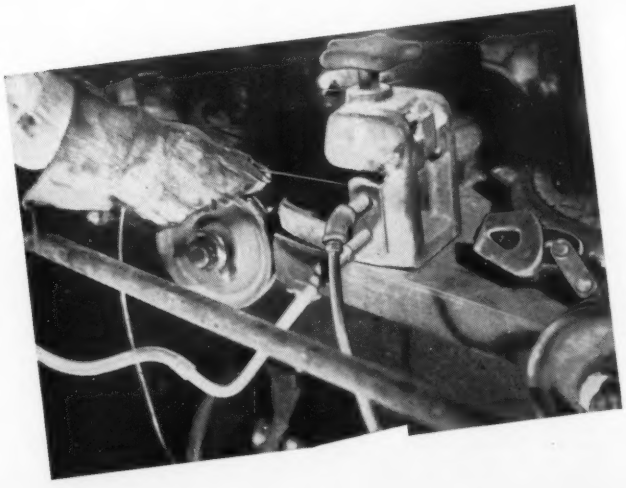
YARN TESTERS—
Scott, Henry L., Co., Providence, R. I.

ZINC—Slab
St. Joseph Lead Co., Josephtown, Beaver County, Pa.

THE *President* LOOKS AT PROFITS

PROFITS are important — and so are the reasons behind them, as the president is careful to point out. His investment in Morgan Wire Machinery is paying good dividends through ✓ greater production and ✓ all-round savings in costs. Power bills are cut—repair bills, shut-down costs, and spoilage almost completely eliminated. Operation of the dependable Morgan-Connor Continuous Wire Drawing Machines actually is continuous. More orders are coming in because ✓ prices are right, ✓ quality consistently good, and ✓ deliveries made on schedule. The company's choice of Morgan machinery is strongly approved in both the mill and the directors' room.

Continuous Wire Drawing Machines; Take-up Frames; Horizontal Bull Blocks; Vertical Spindle Bull Blocks; Reels; Pointers; Motor Drives; Wire Mill Accessories.



MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS, U. S. A.
Sole European Representatives:
MALMEDIE & CO., Dusseldorf, Germany

MORGAN
WORCESTER
ENGINEERS AND
MANUFACTURERS

MORGAN *Wire Drawing Machinery*

BRIGHT

and

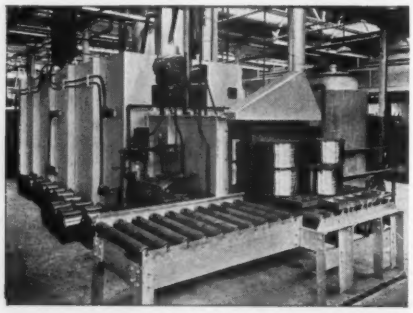
Uniformly Annealed

From Continuous Special Atmosphere Furnaces

Built by The Electric Furnace Co.

★ Ferrous and non-ferrous wire — from the finest gauges to the heaviest sizes — is bright annealed uniformly and economically in various types of controlled atmosphere furnaces we have built.

Coiled wire, as well as wire on small spools and large reels, is successfully handled in these furnaces. No water seals, steam or vapor of any kind is used, thus staining is entirely eliminated and no drying necessary. The wire is discharged from these furnaces uniformly annealed, absolutely bright and dry, ready for shipping, further processing or fabricating. The installation shown below is one of several types of electric and fuel-fired furnaces we have developed for the wire industry.



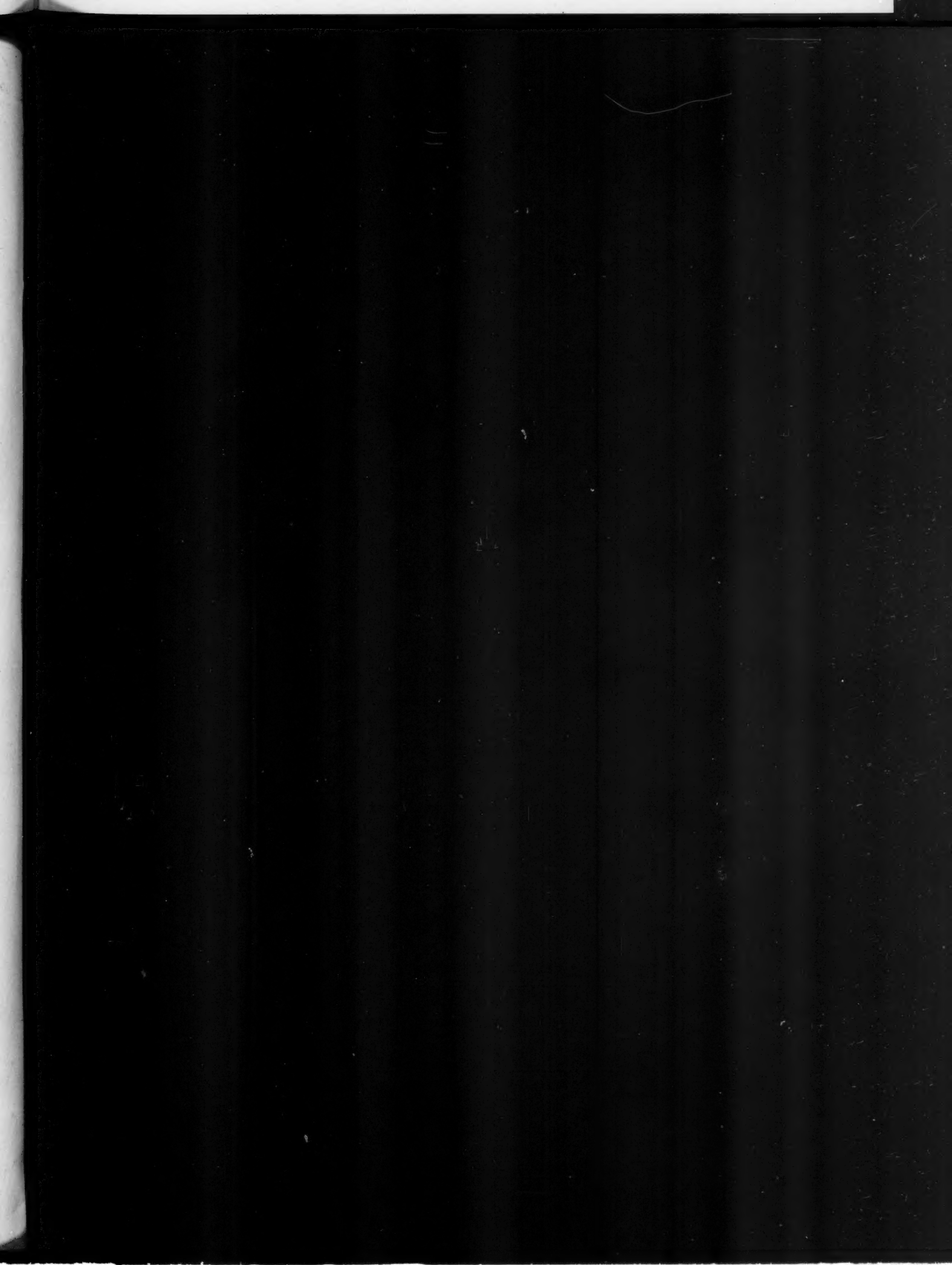
A special atmosphere continuous pusher type furnace for bright annealing both heavy and fine copper wire on large reels, on spools and in coils

Other recent installations include furnaces for bright and clean annealing brass, nickel silver and copper wire; improved pit type furnaces for normalizing rod and bright annealing steel wire in coils, as well as furnaces for scale-free hardening bolts, springs, etc., furnaces for billet heating, bright annealing tubing, strip, stampings; carburizing, copper brazing and other heating and heat treating processes.

If you are interested in improving the quality of your anneal or heat treatment, increasing production or are contemplating any changes or additions to your furnace equipment, our engineers will be glad to work with you. We specialize in building production furnaces to fit the customer's specific requirements — for any heating process — for any product or production.

Ask for our 8-page leaflet showing various types of electric and fuel fired furnaces we have built for bright-annealing wire, tubing strip and other products.

The ELECTRIC FURNACE Co.

ELECTRIC & FUEL FIRED *Furnaces*

SALEM, OHIO